United States
Department of
Agriculture

Natural
Resources
Conservation
Service

In cooperation with
Colorado Agricultural
Experiment Station and
U.S. Department of the
Interior, Bureau of Land
Management

Soil Survey of Douglas-Plateau Area, Colorado, Parts of Garfield and Mesa Counties

How To Use This Soil Survey

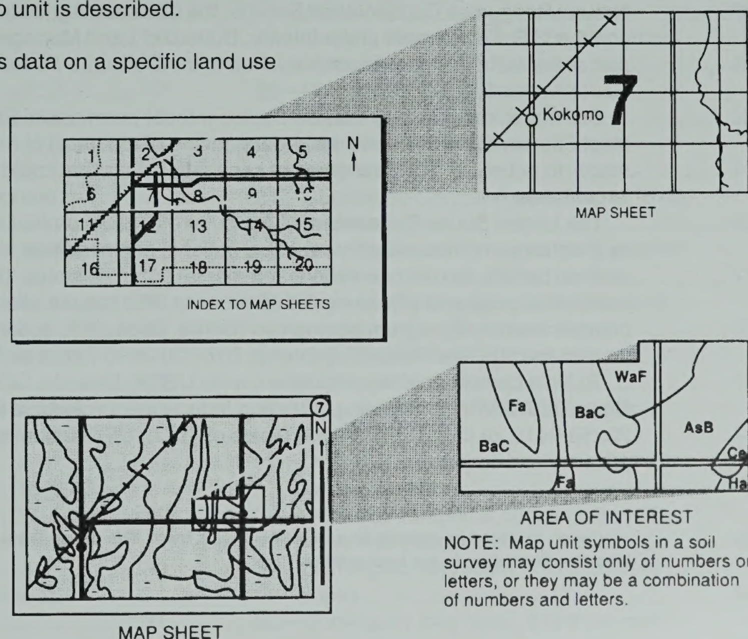
Detailed Soil Maps

The detailed soil maps can be useful in planning the use and management of small areas.

To find information about your area of interest, locate that area on the **Index to Map Sheets**. Note the number of the map sheet and turn to that sheet.

Locate your area of interest on the map sheet. Note the map unit symbols that are in that area. Turn to the **Contents**, which lists the map units by symbol and name and shows the page where each map unit is described.

The **Contents** shows which table has data on a specific land use for each detailed soil map unit. Also see the **Contents** for sections of this publication that may address your specific needs.



NOTE: Map unit symbols in a soil survey may consist only of numbers or letters, or they may be a combination of numbers and letters.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (formerly the Soil Conservation Service) has leadership for the Federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in 1986. Soil names, descriptions, and classifications were approved in 1988. Soil property data were reviewed and updated in 2000. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1988. This survey was made cooperatively by the Natural Resources Conservation Service, the Colorado Agricultural Experiment Station, and the U.S. Department of the Interior, Bureau of Land Management. The survey is part of the technical assistance furnished to the DeBeque-Plateau Valley Soil Conservation District.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

Cover: Irrigated hayland in an area of Peninsula loam. The Green River Formation caps the Wasatch Formation in the background.

Additional information about the Nation's natural resources is available on the Natural Resources Conservation Service homepage on the World Wide Web. The address is http://www.nrcs.usda.gov.

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Foreword

This soil survey contains information that affects land use planning in parts of Garfield and Mesa Counties in Colorado. It contains predictions of soil behavior for selected land uses. The survey also highlights soil limitations, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

This soil survey is designed for many different users. Farmers, ranchers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to ensure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. The information in this report is intended to identify soil properties that are used in making various land use or land treatment decisions. Statements made in this report are intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow to bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.

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Soil Survey of Douglas-Plateau Area, Colorado, Parts of Garfield and Mesa Counties

By David K. Alstatt

Fieldwork by David K. Alstatt, Leslie W. Williams, Terry Snider, and David A. Dyer, Natural Resources Conservation Service

United States Department of Agriculture, Natural Resources Conservation Service, in cooperation with
the Colorado Agricultural Experiment Station and the United States Department of the Interior, Bureau of Land Management

The Douglas-Plateau soil survey area includes parts of Garfield and Mesa Counties in western Colorado (fig. 1). Approximately 63 percent of the survey area is in Garfield County, and the rest is in northeastern Mesa County. The survey area covers 1,021,900 acres, or 1,597 square miles. The survey area has an irregular shape. It extends approximately 74 miles from east to west and ranges from 6 to 46 miles in width.

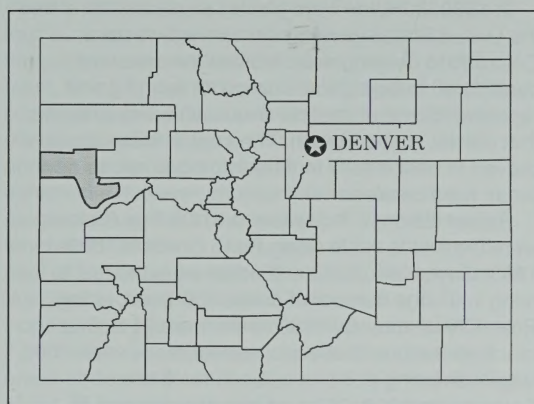

Figure 1.—Location of the survey area in Colorado.

General Nature of the Survey Area

This section provides general information concerning the survey area. It describes history and development; physiography, relief, and drainage; climate; natural resources; water supply; agriculture; transportation facilities; and recreation.

The survey area consists of narrow foothill valleys, high rolling plateaus dissected by steep canyons, narrow mountain valleys, and high mountains. Elevation ranges from 4,800 feet near Cameo, which is along the Colorado River, to 10,000 feet near Palisade Point, which is on Grand Mesa. The major drainageways of the survey area are the Colorado River and its tributaries, principally Roan Creek in the northeastern part of the survey area, East Salt Creek in the northwest, and Plateau Creek in the southeastern part.

The main population centers are DeBeque, which is along the Colorado River in the east-central part of the survey area, and Mesa, Molina, and Collbran in the Plateau Valley in the southeastern part.

The Douglas-Plateau area has extensive deposits of natural gas, coal, and oil shale.

Most of the survey area is used for livestock grazing or as wildlife habitat. The main limitations affecting livestock grazing and wildlife habitat are steep slopes, rockiness, and a lack of water. About 10 percent of the area is woodland that is suitable for livestock grazing, wildlife habitat, and limited timber production. The chief limitations are the short growing

season, the slope, and the lack of water. About 5 percent of the area, along the Colorado River and its tributaries and the Plateau Valley, is used for livestock grazing, wildlife habitat, or irrigated hay and pasture. The chief limitation is the short growing season.

History and Development

The survey area was one of the oldest gathering places for the Ute Indians. These people hunted in the valleys and on the surrounding mountains. The area has been traditionally rich in wildlife. It provided abundant summer and winter hunting, since large herds of deer wintered in the valleys.

The first explorers to enter the survey area were Fathers Escalante and Dominguez in 1776. They entered the southeastern part of the area by crossing Grand Mesa on a northwestward course. They camped along the Colorado River. They continued northwest, crossing the Roan Plateau and descending down Douglas Creek in the north-central part of the area (Hafen, 1948).

In 1880, the Utes were placed on reservations and the United States government opened western Colorado to development. Most of the area was considered to be a good location for farming and ranching. Some of the first areas settled were areas that did not support brush. The land in these areas proved to be too salty for farming, however, so new areas were chosen.

Robert Eaton, L.T. Stewart, and George Gibson were the first to settle along Roan Creek in 1883. In 1883, Gayton and William Kimball were the first to bring in a large number of cattle, 500 head, to the Roan Creek area. By 1888, there were 31 active ranch operations. DeBeque was for many years the largest shipping point for cattle in the State of Colorado. In 1918, 742 cars of cattle, 20 cars of horses, and 10 cars of sheep were shipped. At one time, as many as 25 carloads of apples were shipped from orchards south of DeBeque. The building of the Index plant in 1918 for the extraction of "oil" from the Green River Shale was the beginning of a boom and bust cycle (Prather, 1984). Oil shale activity has been dependent on the world supply of petroleum products.

Settlement of the Plateau Valley also began in the early 1880's. The George Hawxhurst family arrived in what is known as the Meadows Area on October 7, 1881. The Hawxhurst family came into the Valley from the south, down Leon Creek (Young, 1976). Early settlers planted fruit trees and vegetables in the fertile valley soils for their use.

The valley was, and still is, primarily a cattle ranching economy. The cattle ranching industry grew rapidly. The bloody Sheep Wars occurred in the early 1890's, when sheep were brought into the area from the deserts of eastern Utah. The cattle industry won these wars, and only in the early 1920's were permits issued to allow sheep to graze in areas of the National Forest lands.

Physiography, Relief, and Drainage

The survey area is near the eastern extremity of the much more extensive Colorado Plateau. It includes much of the Roan Plateau and much of the Bookcliffs and is peripheral to the major portion of the Grand Valley and to Grand Mesa. In general, the greater part of the area consists of deeply entrenched plateaus; foothills; the lower mesas; and narrow valleys. One broader valley includes a portion of the Colorado River flood plain. Some of the mesas have deposits of silty loess over old river terrace cobbles and stony basaltic outwash. Some of the foothills consist of large earthflows.

The underlying rocks are of relatively late geologic age, mostly from Cretaceous or Tertiary time. They range from many hundreds to thousands of feet in thickness and generally are only slightly tilted and unfolded. For these reasons, the same geologic formation commonly extends over broad areas. Elevations range from more than 10,000 feet at isolated points to less than 4,800 feet on the flood plain along the Colorado River, which slices diagonally across the eastern part of the survey area.

North of the river, the highest lands are mostly on the Roan Plateau, which extends from Rio Blanco County southward into the survey area. The Roan Plateau consists of the generally stable Green River Formation. Some of the steeper portions of the Green River surfaces, however, such as those at Douglas Pass, are unstable if cut into.

Rugged canyons, which have cut through interbedded hard and less resistant sedimentary rocks, are south of the Roan Plateau. On the west end of the survey area, the lands below an elevation of about 5,500 feet are largely rounded hills of Mancos shale. Further east, much of the surfaces are silty and clayey materials that are relatively unstable. In areas where the annual precipitation is more than about 15 inches, this instability is pronounced.

All drainage is into the Colorado River system; the Colorado is the only river in the survey area. Roan Creek is the collecting stream for most of the northeastern part of the area that lies north of the river. Plateau Creek gathers most of the streamflow that

originates south of the river. In addition, much of the Plateau Creek water originates as snowmelt on National Forest lands outside the survey area. Streams west of Cameo, such as East Salt Creek, leave the survey area before discharging into the Colorado River at points a few miles south of the survey area boundary. Streams near the south rim of the Piceance Basin flow northward into Rio Blanco County and reach the Colorado River only after a circuitous route via Piceance Creek and the White River. In the extreme northwestern part of the survey area, East Evacuation Creek flows northward, joining the White River in Utah.

The streams that constitute the drainage grid for Roan Creek embrace the larger portion of the land north of the river and east of Henderson Ridge. These streams occur in a trellis pattern, mostly flowing east or southeast. As a group, they have sculptured the most deeply entrenched waterways in the survey area. Typically, these channels are 1 to 2 miles apart. The ridge summits, which generally are less than one-fourth mile wide, range from 500 to 1,600 feet above the stream channels.

The lower 15 miles of Roan Creek, from a point about 3 miles above its junction with Clear Creek, averages less than 1 percent slope gradient. Within that area, Roan Creek and the lower ends of some of its main tributaries meander within narrow valleys that are generally between 0.3 and 0.7 mile in width. The lands adjoining the streams within those distances are mainly coalescing shaly alluvial fans.

For much of the upper part of its course through the survey area, Plateau Creek is entrenched 100 or more feet below valley terraces. Buzzard and Mesa Creeks also cut through these terraces. Below the junction of Mesa and Plateau Creeks, the streamflow is through a narrowly confined canyon.

The western part of the survey area includes Baxter Pass, Douglas Pass, an extensive portion of the Salt Creek watershed, and the upper end of Evacuation Creek. The ridgecrests and shoulders are mostly at an elevation between 7,200 and 8,800 feet and range from 0.1 to 0.4 mile in width. The widths of the stream valley bottoms, which are commonly as much as 2,000 feet lower in elevation, are generally comparable to those of the crests. The drainage orientation is less regular than it is in the northeastern part of the area.

Climate

Table 1 gives data on temperature and precipitation for the survey area as recorded at Collbran, Colorado, in the period 1961 to 1990. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on the length of the growing season.

In winter, the average temperature is 25.3 degrees F and the average daily minimum temperature is 11.2 degrees. The lowest temperature on record, which occurred on February 8, 1933, was -36 degrees. In summer, the average temperature is 66.7 degrees and the average daily maximum temperature is 84.6 degrees. The highest temperature, which occurred on August 2, 1902, was 100 degrees.

Growing degree days are shown in table 1. They are equivalent to “heat units.” During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (40 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

Temperatures vary inversely with increased elevation, and the average annual precipitation varies directly with increased elevation. For each thousand-foot increase in elevation, the average annual temperature decreases about 2 degrees F. Local relief, which forces topographical lifting and thermal convection, prevents a uniform relationship between elevation and average annual precipitation. From about 9 inches of precipitation at the lowest elevations, however, moisture increases within a range of about 2.5 to 4.0 inches per each thousand-foot rise in elevation. Thus, most of the area that is near or below an elevation of about 5,000 feet has an average annual precipitation between 9 and 10 inches; most areas at elevations between 6,500 and 7,500 feet receive between 16 and 20 inches; and areas above an elevation of about 8,500 feet receive about 25 inches or more. The average annual precipitation at Collbran, which is at an elevation of about 6,200 feet, is about 13.58 inches. Of this annual total, 4.4 inches, or about 33 percent, usually falls in June through September. The growing season for most crops falls within this period. The heaviest 1-day rainfall on record at Collbran was 2.45 inches on October 13, 1957. Thunderstorms occur on about 35 days each year, and most occur in July and August.

Average seasonal snowfall is quite varied throughout the survey area. The greatest amounts are in the mountains and on high mesas, where more than 100 inches of snow falls each year. At the lower elevations the average seasonal snowfall is generally between 40 and 60 inches. At Collbran, the average annual snowfall is 55.7 inches. The greatest snow

Table 1.--Temperature and Precipitation

(Recorded in the period 1961-90 at Collbran, Colorado.)

Month	Temperature						Precipitation				
				2 years in 10 will have--				2 years in 10 will have--			
	Average daily maximum	Average daily minimum	Average	Maximum temperature higher than--	Minimum temperature lower than--	Average number of growing degree days*	Average	Less than--	More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January----	36.6	7.3	21.9	53	-19	0	0.70	0.36	1.00	2	12.5
February---	43.2	14.5	28.8	61	-11	7	.72	.23	1.12	2	8.1
March------	50.1	22.0	36.1	70	-1	45	1.45	.57	2.20	4	10.6
April------	60.8	30.1	45.4	79	9	199	1.27	.65	1.81	4	4.2
May--------	70.9	37.9	54.4	85	23	437	1.27	.60	2.04	3	.9
June-------	81.3	45.4	63.4	94	30	695	.78	.29	1.24	2	.0
July-------	87.6	51.4	69.5	97	41	914	1.10	.47	1.64	3	.0
August-----	85.0	49.4	67.2	95	36	835	1.16	.58	1.75	3	.0
September--	76.5	40.2	58.7	91	23	559	1.39	.43	2.17	4	.0
October----	65.7	31.2	48.4	82	12	280	1.42	.66	2.18	3	1.6
November---	49.5	21.2	35.3	68	0	41	1.21	.45	1.85	3	5.3
December---	38.6	11.7	25.1	56	-12	2	1.09	.55	1.57	3	12.5
Yearly:											
Average---	62.1	30.2	46.2	---	---	---	---	---	---	---	---
Extreme---	---	---	---	98	-21	---	---	---	---	---	---
Total-----	---	---	---	---	---	4,015	13.58	9.81	16.55	36	55.7

* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (40 degrees F).

Table 2.--Freeze Dates in Spring and Fall

(Recorded in the period 1961-90 at Collbran, Colorado.)

Probability	Temperature 24 °F or lower	28 °F or lower	32 °F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	May 18	June 6	June 15
2 years in 10 later than--	May 11	May 29	June 12
5 years in 10 later than--	Apr. 26	May 14	May 31
First freezing temperature in fall:			
1 year in 10 earlier than--	Sept. 21	Sept. 11	Aug. 29
2 years in 10 earlier than--	Sept. 29	Sept. 18	Sept. 5
5 years in 10 earlier than--	Oct. 13	Oct. 1	Sept. 19

Table 3.--Growing Season

(Recorded in the period 1961-90 at Collbran, Colorado.)

Probability	Daily minimum temperature during growing season		
	Higher than 24 °F	Higher than 28 °F	Higher than 32 °F
	Days	Days	Days
9 years in 10	129	102	82
8 years in 10	142	115	92
5 years in 10	169	140	112
2 years in 10	195	164	132
1 year in 10	209	177	142

depth at any one time was 33 inches, recorded on February 29, 1960. On an average, 54 days per year have at least 1 inch of snow on the ground. The heaviest 1-day snowfall on record was 15 inches, recorded on January 28, 1909.

The average relative humidity in midafternoon is about 36 percent. Humidity is higher at night, and the average at dawn is about 60 percent. The sun shines about 78 percent of the time possible in summer and 60 percent in winter. The prevailing wind is from the west. Average windspeed is highest, about 10 miles per hour, from April to July.

Natural Resources

Soil, water, natural gas, coal, oil shale, sand and gravel, and wildlife are the principal natural resources in the survey area. The purpose of this survey is to provide assistance in maintaining and improving the value of the soil resource.

The major sources of surface water in the survey area are the Colorado River and its tributaries, including Roan Creek in the northeast and Plateau Creek in the southeast. There is no extensive aquifer in the survey area.

Numerous natural gas wells are throughout the survey area. Coal deposits are located in the Mesa Verde geologic group. This formation crops out in the Little Bookcliffs and in the area extending north of these cliffs, along the Colorado River in DeBeque Canyon, in the lower end of the Plateau Valley, and along the southern and western slopes of Grand Mesa. Most of the coal beds in the Little Bookcliffs occur in the lower part of the Mount Garfield Formation of the Mesa Verde group. Oil shale deposits occur in the Evacuation Creek member of the Green River Formation.

The northeastern part of the survey area contains the thickest, richest, and most easily mined oil shale (actually marlstone rather than shale) deposits in the Green River Formations of Colorado, Utah, and Wyoming (Savage, 1967). The Green River Formation is the largest oil shale deposit in the world. Sand and gravel deposits are along the terraces adjacent to the Colorado River in the eastern part of the survey area. These deposits have been developed and used to some extent for construction of an interstate highway and for local building.

The Douglas-Plateau area has some of the best hunting and fishing in the State of Colorado. Well managed fish and game programs are responsible for the development of this resource.

Water Supply

Most of the geological material underlying the survey area is relatively impervious to water. Except for the alluvium underlying the major streams, there are no known extensive aquifers for substantial natural underground water storage.

The Colorado River bisects the eastern part of the survey area, where it receives the flow from Roan Creek near DeBeque and Plateau Creek near Cameo. Plateau Creek absorbs the flow from Buzzard Creek at its convergence at Collbran. In quantity, Plateau Creek has an average flow of about 129,700 acre-feet per year at its mouth near Cameo. Roan Creek has an average flow of about 3,720 acre-feet per year (Water Resources Data, 1981). Much of the water received by Plateau and Buzzard Creeks originates in the springs, ponds, and snowmelt within the National Forest and outside the survey area.

Vega Reservoir, which is the largest water storage facility in the survey area, was constructed in 1960 (fig. 2). The earth and rockfill dam holds back almost 33,000 acre-feet of water, or one-half the pre-1960 annual flow of Plateau Creek. In addition to irrigation water, the facility provides flood control, wildlife, and recreation benefits.

The northern part of the survey area has numerous springs above an elevation of about 8,000 feet. Andrews Reservoir, which is north of Baxter Pass, is the largest reservoir north of the river. It is partially regulated by spring flow.

The water in Plateau Creek and Roan Creek is generally well suited to irrigation and livestock use. The water in Plateau Creek, however, is generally lower in chemical elements than that in Roan Creek. Water from the higher elevations is cold enough for trout.

Agriculture

Farming today is primarily concerned with forage for livestock production. About 3 percent of the survey area, or about 30,000 acres, is used for crops and pasture. All of this land is under some type of irrigation. Approximately 90 percent of it is used for alfalfa and alfalfa grass mixtures for hay (fig. 3). Small grain crops, such as oats, are primarily used as a cover crop for reestablishing stands of alfalfa and grass-hay. Other irrigated crops include small acreages of oats, corn for silage, and barley. Irrigation methods include furrow irrigation, contour ditches and flooding, and gravity sprinkler systems. Gravity

Figure 2.—An area of Hesperus-Empedrado, moist-Pagoda complex, 35 to 55 percent slopes, surrounding Vega Reservoir.

sprinkler systems are becoming popular methods of irrigation in the Plateau Valley. Gravity sprinklers can easily be adapted in this area because of the large drops in elevation.

Raising livestock is the most important agricultural enterprise in the survey area. Most livestock ranches are cow-calf operations. A few ranches raise feeder calves and sell them to commercial feedlots elsewhere. About 85 percent of the survey area is native rangeland, and 10 percent is woodland with considerable grazing value.

Sixty-two percent of the land in the Douglas-Plateau area is administered by the Bureau of Land Management. The survey area is also surrounded by land administered by the Bureau of Land Management and the Forest Service. Most ranchers in the area lease grazing allotments on these lands for summer grazing. Hay, grain, and forage for ensilage are grown under irrigation on private lands and fed to the livestock in the winter.

Transportation Facilities

The Rio Grand Railroad and an interstate highway follow the Colorado River through the southeastern part of the survey area. Several paved State and county roads provide access to other parts of the area. A paved road crosses Douglas Pass in the northwestern part of the survey area, but massive slumps have closed this road on several occasions. A paved road up Plateau Creek Canyon provides access to Powderhorn Ski Area, Grand Mesa, Vega Reservoir, and the towns of Mesa, Molina, and Collbran. A portion of Roan Creek, north of DeBeque, is also accessible by paved road. Other areas may be accessed by unpaved roads and trails. Following

Figure 3.—Irrigated hayland in an area of Battlement loam, 1 to 8 percent slopes.

periods of heavy rainfall, unpaved roads and trails in areas of soils that formed in Mancos and Wasatch shales are virtually impassable.

Recreation

Big game hunting is a major recreational activity in the Douglas-Plateau area. The adjoining National Forest lands support large populations of deer and elk. The adjacent Grand Mesa National Forest is a popular summer and winter recreational area. Vega Reservoir and the lakes on Grand Mesa are well stocked and provide excellent trout fishing. Hiking and camping are also popular.

The survey area has opportunities for cross-country and downhill skiing and snowmobiling. The Powderhorn Ski Area provides a wide variety of winter recreational activities.

How This Survey Was Made

This survey was made to provide information about the soils and miscellaneous areas in the survey area. The information includes a description of the soils and miscellaneous areas and their location and a discussion of their suitability, limitations, and management for specified uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

The soils and miscellaneous areas in the survey area are in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Detailed Soil Map Units

The map units delineated on the detailed soil maps in this survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions in this section, along with the maps, can be used to determine the suitability and potential of a unit for specific uses. They also can be used to plan the management needed for those uses.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some "included" areas that belong to other taxonomic classes.

Most included soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, inclusions. They may or may not be mentioned in the map unit description. Other included soils and miscellaneous areas, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, inclusions. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. The included areas of contrasting soils or miscellaneous areas are mentioned in the map unit descriptions. A few included areas may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of included areas in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series.* Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases.* Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Fughes clay loam, 2 to 6 percent slopes, is a phase of the Fughes series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are called complexes or associations.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Fughes-Hesperus complex, 3 to 12 percent slopes, is an example.

An *association* is made up of two or more

geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Happle-Rock outcrop association, 25 to 65 percent slopes, is an example.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Badland is an example.

Table 4 gives the acreage and proportionate extent of each map unit. Other tables (see Contents) give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils or miscellaneous areas.

Table 4.--Acreage and Proportionate Extent of the Soils

Map symbol	Soil name	Garfield County	Mesa County	Total	
				Area	Extent
		Acres	Acres	Acres	Pct
1	Aga very fine sandy loam, 0 to 3 percent slopes	0	1,019	1,019	*
2	Badland	10,395	13,136	23,531	2.3
3	Barx loam, 3 to 12 percent slopes	992	12,923	13,915	1.4
4	Barx-Clapper complex, 3 to 12 percent slopes	0	4,053	4,053	0.4
5	Battlement loam, 1 to 8 percent slopes	6,327	1,252	7,579	0.7
6	Battlement loam, saline, 1 to 8 percent slopes	747	0	747	*
7	Biedsaw-Sunup gravelly loams, 10 to 40 percent slopes	27,099	15,598	42,697	4.2
8	Billings silty clay loam, 1 to 6 percent slopes	685	0	685	*
9	Bookcliff-Utso, cool, complex, 3 to 25 percent slopes	5,782	0	5,782	0.6
10	Borollic Calciorthids, 25 to 50 percent slopes	0	3,737	3,737	0.4
11	Borpark stony loam, 40 to 75 percent slopes	0	4,776	4,776	0.5
12	Bunkwater very fine sandy loam, 1 to 8 percent slopes	712	9,460	10,172	1.0
13	Caballo very channery loam, 40 to 80 percent slopes	17,706	0	17,706	1.7
14	Callings loam, 1 to 10 percent slopes	0	376	376	*
15	Cameo fine sandy loam, 1 to 6 percent slopes	1,926	2,193	4,119	0.4
16	Castino-Skisams-Winnemucca loams, 1 to 10 percent slopes, stony	0	2,978	2,978	0.3
17	Cathedral-Veatch complex, 25 to 85 percent slopes	15,778	1,462	17,240	1.7
18	Cerro silty clay loam, 2 to 6 percent slopes	0	520	520	*
19	Cerro silty clay loam, 6 to 12 percent slopes	0	2,949	2,949	0.3
20	Cerro silty clay loam, 12 to 25 percent slopes	0	1,370	1,370	0.1
21	Chipeta silty clay loam, 3 to 30 percent slopes	1,806	0	1,806	0.2
22	Clapper very stony loam, 12 to 25 percent slopes	0	4,805	4,805	0.5
23	Clapper very stony loam, 25 to 65 percent slopes	0	7,181	7,181	0.7
24	Cochetopa-Clayburn complex, 12 to 40 percent slopes	0	11,158	11,158	1.1
25	Cowestglen sandy loam, 1 to 8 percent slopes	237	0	237	*
26	Cryochrepts-Cryoborolls-Rubble land complex, 15 to 90 percent slopes	0	1,958	1,958	0.2
27	Cryorthents-Rock outcrop complex, 50 to 90 percent slopes	14,788	170	14,958	1.5
28	Cumulic Haploborolls, 1 to 3 percent slopes	1,552	1,251	2,803	0.3
29	Debeque very channery loam, 5 to 20 percent slopes	4,720	26	4,746	0.5

See footnote at end of table.

Table 4.--Acreage and Proportionate Extent of the Soils--Continued

Map symbol	Soil name	Garfield County	Mesa County	Total Area	Total Extent
		Acres	Acres	Acres	Pct
30	Debeque-Hesperus complex, 5 to 25 percent slopes	3,845	0	3,845	0.4
31	Dominguez clay loam, 1 to 3 percent slopes	514	125	639	*
32	Dominguez clay loam, 3 to 8 percent slopes	2,975	5,835	8,810	0.9
33	Emmons-Cerro-Pagoda complex, 5 to 30 percent slopes, very stony	0	5,413	5,413	0.5
34	Empedrado loam, 25 to 45 percent slopes	0	5,570	5,570	0.5
35	Empedrado-Pagoda-Godding complex, 6 to 25 percent slopes, stony	0	6,407	6,407	0.6
36	Fluvaquents, 0 to 3 percent slopes	0	1,784	1,784	0.2
37	Fughes clay loam, 2 to 6 percent slopes	0	4,649	4,649	0.5
38	Fughes clay loam, 3 to 9 percent slopes, stony	0	1,566	1,566	0.2
39	Fughes-Hesperus complex, 3 to 12 percent slopes	0	2,943	2,943	0.3
40	Godding stony loam, 9 to 25 percent slopes, extremely bouldery	0	6,350	6,350	0.6
41	Golime cobbly loam, 5 to 15 percent slopes, very bouldery	0	1,856	1,856	0.2
42	Grobutte very channery loam, 30 to 60 percent slopes	4,017	1,734	5,751	0.6
43	Haploborolls-Rock outcrop complex, 50 to 80 percent slopes	753	0	753	*
44	Happle very channery sandy loam, 3 to 12 percent slopes	7,914	239	8,153	0.8
45	Happle very channery sandy loam, 12 to 25 percent slopes	2,381	0	2,381	0.2
46	Happle-Rock outcrop association, 25 to 65 percent slopes	28,466	2,981	31,447	3.1
47	Hesperus-Empedrado, moist-Pagoda complex, 5 to 35 percent slopes	35,204	20,004	55,208	5.4
48	Hesperus-Empedrado, moist-Pagoda complex, 35 to 55 percent slopes	5,274	7,425	12,699	1.2
49	Hesperus-Pagoda complex, 3 to 12 percent slopes	0	8,370	8,370	0.8
50	Irigul-Starman channery loams, 5 to 35 percent slopes	3,438	0	3,438	0.3
51	Mesa-Avalon complex, 3 to 12 percent slopes	8,920	235	9,155	0.9
52	Northwater-Adel complex, 5 to 50 percent slopes	25,187	1,238	26,425	2.6
53	Pagoda-Hesperus complex, 12 to 40 percent slopes	0	5,854	5,854	0.6
54	Panitchen loam, 1 to 6 percent slopes	6,101	2,272	8,373	0.8
55	Parachute-Irigul complex, 5 to 30 percent slopes	42,376	355	42,731	4.2
56	Parachute-Irigul-Rhone association, 25 to 50 percent slopes	89,471	1,710	91,181	8.9
57	Parachute-Rhone loams, 5 to 30 percent slopes	9,480	0	9,480	0.9
58	Peninsula loam, 3 to 9 percent slopes	0	14,405	14,405	1.4
59	Persayo silty clay loam, 3 to 25 percent slopes	380	0	380	*
60	Redcreek-Rentsac complex, 5 to 40 percent slopes	1,771	3,539	5,310	0.5
61	Rock outcrop-Torriorthents complex, 15 to 90 percent slopes	24,514	16,990	41,504	4.1
62	Shawa loam, 3 to 20 percent slopes	0	2,481	2,481	0.2
63	Silas loam, 1 to 12 percent slopes	6,327	0	6,327	0.6
64	Torrifluvents-Gullied land complex, 0 to 2 percent slopes	110	0	110	*
65	Torriorthents, cool-Rock outcrop complex, 35 to 90 percent slopes	83,049	24,898	107,947	10.6

See footnote at end of table.

Table 4.--Acreage and Proportionate Extent of the Soils--Continued

Map symbol	Soil name	Garfield County	Mesa County	Total Area	Total Extent
		Acres	Acres	Acres	Pct
66	Torriorthents, warm-Rock outcrop complex, 35 to 90 percent slopes	14,835	33,276	48,111	4.7
67	Tosca channery loam, 25 to 80 percent slopes	73,890	2,053	75,943	7.4
68	Trail loamy sand, 1 to 5 percent slopes	1,661	0	1,661	0.2
69	Travessilla-Rock outcrop complex, 10 to 35 percent slopes	1,195	41,271	42,466	4.2
70	Uffens loam, 1 to 8 percent slopes	614	2,207	2,821	0.3
71	Utso-Rock outcrop complex, 40 to 90 percent slopes	27,121	5	27,126	2.7
72	Wesdy stony loam, 9 to 25 percent slopes, very bouldery	0	2,125	2,125	0.2
73	Wesdy-Northwater complex, 25 to 65 percent slopes, very bouldery	0	1,925	1,925	0.2
74	Winnemucca-Castino loams, 1 to 10 percent slopes, stony	0	1,417	1,417	0.1
75	Wrayha-Rabbitex-Veatch complex, 45 to 65 percent slopes, very stony	14,244	667	14,911	1.5
76	Wrayha-Veatch-Rabbitex complex, 12 to 45 percent slopes	2,383	25,323	27,706	2.7
77	Yamo, moist-Redcreek complex, 3 to 25 percent slopes	0	3,903	3,903	0.4
78	Youngston loam, 1 to 6 percent slopes	990	3,154	4,144	0.4
79	Water	48	2,295	2,343	0.2
	Total	640,700	381,200	1,021,900	100.0

* Less than 0.1 percent.

1—Aga very fine sandy loam, 0 to 3 percent slopes

This deep, well drained soil is on river terraces and flood plains. It formed in alluvium derived dominantly from mixed sources. The native vegetation is mainly cottonwood, sagebrush, sacaton, and grasses. Elevation is 4,500 to 6,200 feet. The average annual precipitation is 8 to 10 inches, the average annual air temperature is 46 to 52 degrees F, and the average frost-free period is 100 to 150 days.

Typically, the surface layer is brown very fine sandy loam about 3 inches thick. The next layer is pale brown very fine sandy loam about 4 inches thick. The upper 13 inches of the underlying material is brown very fine sandy loam. The next part is 8 inches of pale brown loamy sand. The lower part to a depth of 60 inches or more is variegated extremely gravelly sand.

Included in mapping are small areas of Panitchen loam, Uffens loam, and Cameo fine sandy loam and areas of soils that are similar to but wetter than the Aga soil.

Permeability is moderate in the upper part of the Aga soil and rapid in the lower part. The available water capacity is low. The effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. This soil is subject to occasional flooding for brief periods.

This unit is used for livestock grazing, as wildlife habitat, or as a source of sand and gravel.

The potential plant community is mainly cottonwood, western wheatgrass, slender wheatgrass, skunkbush sumac, willow, and many forbs. The existing vegetation is typically a mixture of native and introduced species that have washed in during brief flooding periods. The potential production of the native understory vegetation in normal years is about 1,700 pounds of air-dry vegetation per acre.

Adapted introduced species suitable for pasture planting are intermediate wheatgrass, smooth brome, and orchardgrass. The plants selected for seeding should meet the seasonal requirements of livestock, wildlife, or both. Suitable management practices include proper range use, deferred grazing, and a planned grazing system.

This soil is a poor source of reconstruction material for drastically disturbed areas because of excess lime, large stones, and excess sand.

This unit is in the Riverbottom ecological site #236.

2—Badland

This map unit is on rolling to very steep, nearly barren mountainsides, low hills, ridgetops, and canyon sides. It formed in residuum derived dominantly from highly calcareous and gypsiferous shale and bentonite. Slope ranges from 10 to 65 percent. The native vegetation is mainly very sparse low desert shrubs and grasses. Elevation is 5,200 to 7,300 feet. The average annual precipitation is 8 to 18 inches, the average annual air temperature is 40 to 50 degrees F, and the average frost-free period is 75 to 130 days.

The Badland is very shallow and exhibits no significant soil characteristics.

Included in mapping are small areas of Chipeta silty clay loam, Rentsac channery sandy loam, and Rock outcrop.

Permeability is very slow in the Badland. The available water capacity is very low. The effective rooting depth is 0 to 10 inches. Runoff is very rapid, and the hazard of water erosion is very severe.

The use of this map unit is very limited because of the slope, the shrink-swell potential, and the susceptibility to mass movement.

3—Barx loam, 3 to 12 percent slopes

This deep, well drained soil is on structural benches. It formed in eolian deposits derived dominantly from mixed materials. The native vegetation is mainly sagebrush, grasses, and forbs (fig. 4). Elevation is 5,000 to 6,400 feet. The average annual precipitation is 12 to 16 inches, the average annual air temperature is 46 to 52 degrees F, and the average frost-free period is 110 to 150 days.

Typically, the surface layer is brown loam about 3 inches thick. The upper 11 inches of the subsoil is reddish brown clay loam. The lower 26 inches is pink loam. The substratum to a depth of 60 inches or more is light reddish brown loam.

Included in mapping are small areas of Bunkwater very fine sandy loam and Travessilla fine sandy loam. Also included are areas of soils that are similar to the Barx soil but have up to 25 percent gravel in the lower part of the profile or are 20 to 40 inches deep over sandstone.

Permeability is moderately slow in the Barx soil. The available water capacity is high. The effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is severe.

This unit is used for livestock grazing or as wildlife habitat.

The potential plant community is mainly western wheatgrass, needleandthread, bottlebrush squirreltail, Sandberg bluegrass, and Wyoming big sagebrush. Other less extensive grasses are Indian ricegrass and prairie Junegrass. If range condition declines as a result of overgrazing, forbs and Wyoming big sagebrush increase. If continued deterioration is allowed, cheatgrass, juniper, annual buttercup, and other annuals invade. The average annual production of air-dry vegetation is about 800 pounds per acre.

Range seeding is suitable if the range is in poor condition. Seeding late in fall helps to ensure establishment of seedlings the following spring when the content of moisture in the soil is more likely to be adequate. Native grasses that are adapted to the soil are western wheatgrass, prairie Junegrass, and Indian ricegrass. Introduced grasses that are adapted are crested wheatgrass and pubescent wheatgrass. The plants selected for seeding should meet the seasonal requirements of livestock, wildlife, or both. Brush management can improve deteriorated areas of range that are producing more woody shrubs than were present in the potential plant community. Suitable management practices are proper range use, deferred grazing, and a planned grazing system.

The upper 10 to 15 inches of this soil is a fair or good source of reconstruction material for drastically disturbed areas. Below a depth of about 15 inches, however, the soil is a poor source of reconstruction material because of excess lime.

This unit is in the Rolling Loam ecological site #298 (fig. 5).

4—Barx-Clapper complex, 3 to 12 percent slopes

This map unit is on a dissected plateau. The native vegetation is mainly sagebrush, juniper, rabbitbrush, and wheatgrasses. Elevation is 5,600 to 7,100 feet. The average annual precipitation is 12 to 15 inches, the average annual air temperature is 46 to 52 degrees F, and the average frost-free period is 110 to 150 days.

This unit is about 60 percent Barx loam and 25 percent Clapper very stony loam. The two soils occur as areas so intricately intermingled that mapping them separately was not practical at the scale used.

Included in mapping are small areas of soils that are similar to the Barx soil but have 20 to 35 percent basalt cobbles and stones on the surface or in the

Figure 4.—An area of Barx loam, 3 to 12 percent slopes. The area in the foreground has been reseeded.

profile. Also included are soils that do not have a developed subsoil.

The Barx soil is deep and well drained. It formed in eolian material and residuum derived dominantly from mixed sources. Typically, the surface layer is brown loam about 3 inches thick. The upper 11 inches of the subsoil is reddish brown clay loam. The lower 26 inches is pink loam. The substratum to a depth of 60 inches or more is light reddish brown loam.

Permeability is moderately slow in the Barx soil. The available water capacity is high. The effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is severe.

The Clapper soil is deep and well drained. It formed in residuum derived dominantly from glacial till containing basalt stones. Typically, the surface layer is brown very stony loam about 3 inches thick. The upper 9 inches of the subsoil is brown very stony loam. The next 14 inches is very pale brown very cobbly loam. The lower part to a depth of 60 inches or more is light yellowish brown very cobbly loam.

Permeability is moderate in the Clapper soil. The available water capacity is low. The effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is severe.

This unit is used for livestock grazing or as wildlife habitat.

The potential plant community on the Barx soil is mainly western wheatgrass, needleandthread, bottlebrush squirreltail, Sandberg bluegrass, and Wyoming big sagebrush. Other less extensive grasses are Indian ricegrass, prairie Junegrass, and several

forbs. If range condition declines as a result of overgrazing, forbs and Wyoming big sagebrush increase. If continued deterioration is allowed, bulbous bluegrass, cheatgrass, and Utah juniper invade. The average annual production of air-dry vegetation is about 800 pounds per acre.

Range seeding is suitable on the Barx soil if the range is in poor condition. Seeding late in fall helps to ensure establishment of seedlings the following spring when the content of moisture in the soil is more likely to be adequate. Native grasses that are adapted to the soil are western wheatgrass, needleandthread, and Indian ricegrass. Introduced grasses that are adapted are crested wheatgrass and pubescent wheatgrass. The plants selected for seeding should meet the seasonal requirements of livestock, wildlife, or both. Brush management can improve deteriorated areas of range that are producing more woody shrubs than were present in the potential plant community. Suitable management practices are proper range use, deferred grazing, and a planned grazing system.

The potential plant community on the Clapper soil is mainly Utah juniper and an understory of galleta, bottlebrush squirreltail, Sandberg bluegrass, and Wyoming big sagebrush. If the condition of the range deteriorates, the proportion of forbs, Wyoming big sagebrush, and juniper increases. The potential production of the native understory vegetation in normal years is about 350 pounds of air-dry vegetation per acre.

If the trees are removed and the soil surface is not too rocky, areas of the Clapper soil can be seeded and used as range, pasture, or wildlife habitat. Native grasses that are adapted to the soil are Indian ricegrass, Sandberg bluegrass, and bottlebrush squirreltail. Introduced grasses that are adapted are crested wheatgrass and pubescent wheatgrass. The plants selected for seeding should meet the seasonal

Figure 5.—A typical area of Barx loam, 3 to 12 percent slopes, in the Rolling Loam ecological site. Grand Mesa is in the background.

requirements of livestock, wildlife, or both. Seeding late in fall helps to ensure establishment of seedlings the following spring when the content of moisture in the soil is more likely to be adequate.

Areas of the Clapper soil are dominated by juniper trees and an understory of grasses. These areas are used as a source of firewood, fence posts, and Christmas trees.

The Barx soil is only a fair source of reconstruction material for drastically disturbed areas because of high erodibility. The Clapper soil is a poor source of reconstruction material because of the large stones throughout the profile.

The capability classification of this map unit is 6e, nonirrigated. The Barx soil is in the Rolling Loam ecological site #298, and the Clapper soil is in the Foothill Juniper ecological site #447.

5—Battlement loam, 1 to 8 percent slopes

This deep, well drained soil is on flood plains, stream bottoms, and narrow valley bottoms (fig. 6). It formed in alluvium derived dominantly from sedimentary rock. The native vegetation is mainly sagebrush, grasses, and forbs. Elevation is 5,800 to 7,200 feet. The average annual precipitation is 12 to 16 inches, the average annual air temperature is 42 to 46 degrees F, and the average frost-free period is 80 to 105 days.

Typically, the surface layer is dark grayish brown loam about 6 inches thick. The underlying material to a depth of 60 inches or more is light brownish gray, stratified loam and clay loam with lenses of sandy loam and fine sandy loam.

Included in mapping are small areas of Cowestglen sandy loam.

Permeability is moderate in the Battlement soil. The available water capacity is high. The effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is slight. Small areas of this soil are subject to rare flooding for brief periods in spring and summer.

This unit is used for livestock grazing or as wildlife habitat. The unit can be used for irrigated hay and pasture if water is made available.

The potential plant community is mainly basin wildrye, western wheatgrass, and basin big sagebrush. If range condition declines as a result of overgrazing, shrubs are the principal increasers. If continued deterioration is allowed, cheatgrass, greasewood, Kentucky bluegrass, cactus, lambsquarter, mustard, and broom snakeweed invade. The average annual production of air-dry vegetation is about 2,000 pounds per acre. Brush management improves deteriorated areas of range that are producing more woody shrubs than were present in the potential plant community. If the range vegetation has seriously deteriorated, seeding is needed. Suitable mixtures for range seeding include western wheatgrass and basin wildrye. Pubescent wheatgrass is a suitable introduced species. The species selected for seeding should meet the seasonal requirements of livestock, wildlife, or both. Seeding late in fall helps to ensure establishment of seedlings the following spring when the content of moisture in the soil is more likely to be adequate. Suitable management practices are proper grazing use, deferred grazing, and a planned grazing system.

This unit is well suited to hay and pasture. If this soil is used for hay and pasture, the main limitation is the roughness of the landscape. Leveling helps to ensure the uniform application of water. Irrigation water can be applied by furrow and sprinkler methods. Proper grazing practices, weed control, and fertilizer are needed to ensure maximum quality of forage. Periodic mowing and clipping help to maintain uniform growth, discourage selective grazing, and reduce clumpy growth.

This soil is only a fair source of reconstruction material for drastically disturbed areas because of excess lime.

The capability classification is 4e, irrigated and nonirrigated. This soil is in the Foothill Swale ecological site #285.

6—Battlement loam, saline, 1 to 8 percent slopes

This deep, well drained soil is on flood plains, stream terraces, and narrow valley bottoms. It formed in alluvium derived dominantly from sandstone, shale, limestone, and siltstone. The native vegetation is mainly greasewood, sagebrush, grasses, and forbs. Elevation is 5,800 to 7,200 feet. The average annual precipitation is 12 to 16 inches, the average annual air temperature is 42 to 46 degrees F, and the average frost-free period is 80 to 105 days.

Typically, the surface layer is dark grayish brown loam about 6 inches thick. The underlying material to a depth of 60 inches or more is light brownish gray, stratified loam and clay loam with lenses of sandy loam.

Included in mapping are small areas of Cowestglen fine sandy loam.

Permeability is moderate in the Battlement soil. The available water capacity also is moderate and is limited by salinity. Runoff is medium, and the hazard of water erosion is slight to severe. Small areas of this

Figure 6.—An area of Battlement loam, 1 to 8 percent slopes. This soil is in the Foothill Swale ecological site. Rock outcrop-Torriorthents complex, 15 to 90 percent slopes, is in the background.

soil are subject to rare flooding for brief periods in spring and summer.

This unit is used for livestock grazing or as wildlife habitat. The production of vegetation suitable for livestock grazing is limited by drought and salinity.

The potential plant community is mainly alkali sacaton, inland saltgrass, and western wheatgrass. Other plants include fourwing saltbush, greasewood, sedges, and rushes. If range condition declines as a result of overgrazing, greasewood and inland saltgrass increase. If continued deterioration is allowed, Russian thistle, mustard, and Kentucky bluegrass invade. The average annual production of air-dry vegetation is about 2,000 pounds per acre. If deep gullies dissect areas of this map unit, however, the kind and amount of vegetation will vary. Brush management can improve deteriorated areas of range that are producing more woody shrubs than were present in the potential plant community. If the range vegetation has seriously deteriorated, seeding is needed. Suitable seeding mixtures include western wheatgrass and alkali sacaton. Tall wheatgrass is adapted for use as a hay or pasture species. The plants selected for seeding should meet the seasonal requirements of livestock, wildlife, or both. Seeding late in fall helps to ensure establishment of seedlings the following spring when the content of moisture in the soil is more likely to be adequate. Suitable management practices are proper grazing use, deferred grazing, and a planned grazing system.

This soil is only a fair source of reconstruction material for drastically disturbed areas because of excess salt and excess lime.

The capability classification is 4s, irrigated, and 6s, nonirrigated. This soil is in the Salt Meadow ecological site #266.

7—Biedsaw-Sunup gravelly loams, 10 to 40 percent slopes

This map unit is on side slopes of mountains and ridges. The native vegetation is mainly juniper, sagebrush, shadscale saltbush, greasewood, ephedra, yucca, and Indian ricegrass. Elevation is 5,100 to 6,600 feet. The average annual precipitation is 12 to 14 inches, the average annual air temperature is 46 to 52 degrees F, and the average frost-free period is 100 to 150 days.

This unit is about 45 percent Biedsaw gravelly loam and 25 percent Sunup gravelly loam. The two soils occur as areas so intricately intermingled that mapping them separately was not practical at the scale used.

Included in mapping are small areas of Barx loam, Dominguez clay loam, Happle very channery sandy loam, and Rock outcrop.

The Biedsaw soil is deep and well drained. It formed in colluvium over residuum derived dominantly from the Wasatch shale formation. Typically, the surface layer is brown gravelly loam about 4 inches thick. The upper 5 inches of the subsoil is brown loam. The next 10 inches is pale brown clay loam. Below this is 24 inches of weak red clay loam. The lower part of the subsoil to a depth of 60 inches or more is dark reddish gray and light brownish gray silty clay loam.

Permeability is slow in the Biedsaw soil. The available water capacity is high. The effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is severe.

The Sunup soil is shallow and well drained. It formed in residuum and colluvium derived dominantly from the Wasatch shale formation. Typically, the surface layer is brown gravelly loam about 4 inches thick. The underlying material is brown very gravelly loam about 7 inches thick. Sandstone is at a depth of about 11 inches.

Permeability is moderate in the Sunup soil. The available water capacity is very low. The effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is severe.

This unit is used for livestock grazing or as wildlife habitat.

The potential plant community is mainly Utah juniper and an understory of galleta, bottlebrush squirreltail, Indian ricegrass, and bluebunch wheatgrass. If range condition declines as a result of overgrazing, bluebunch wheatgrass will decrease and juniper, Wyoming big sagebrush, and cheatgrass will increase. The potential production of the native understory vegetation in normal years is about 300 pounds.

Except for broadcasting, range seeding generally is not practical because of the slope. Suitable management practices are proper grazing use, deferred grazing, and a planned grazing system.

The Biedsaw soil is suited to the production of twoneedle pinyon and juniper for firewood and posts. The site index for twoneedle pinyon and juniper ranges from 50 to 60. Based on a site index of 55 for twoneedle pinyon and juniper, this soil can produce 5.2 cubic feet of wood per acre per year. The main concerns affecting the production and harvesting of timber are the slope, a restricted water-holding capacity, and the rapid runoff rate.

The Sunup soil is marginally suited to the production of firewood and posts. The site index for twoneedle pinyon and juniper ranges from 45 to 55. Based on a site index of 50 for twoneedle pinyon and juniper, this soil can produce less than 4.6 cubic feet of wood per acre per year. The main concerns affecting the production and harvesting of timber are the slope, a restricted water-holding capacity, the rapid runoff rate, and the severe hazard of erosion.

The Biedsaw soil is only a fair source of reconstruction material for drastically disturbed areas because of excess lime and a high content of clay. The Sunup is a poor source of reconstruction material because of large stones.

The capability classification of this unit is 7e, nonirrigated. The unit is in the Foothill Juniper ecological site #447.

8—Billings silty clay loam, 1 to 6 percent slopes

This deep, well drained soil is on flood plains and low terraces. It formed in alluvium derived dominantly from shale. The native vegetation is mainly grass and shrubs. Elevation is 4,800 to 5,800 feet. The average annual precipitation is 7 to 10 inches, the average annual air temperature is 47 to 52 degrees F, and the average frost-free period is 125 to 160 days.

Typically, the surface layer is light brownish gray silty clay loam about 7 inches thick. The upper 6 inches of the underlying material is silty clay loam. The next part is 30 inches of silty clay loam with thin strata of sandy clay loam. The lower part to a depth of 60 inches or more is fine sandy loam.

Included in mapping are small areas of Youngston loam, Trail loamy sand, and Persayo silty clay loam. Included areas make up about 10 percent of the total acreage of this unit.

Permeability is slow in the Billings soil. The

available water capacity is high. The effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion ranges from slight to severe.

This unit is used for livestock grazing.

The potential plant community is mainly alkali sacaton, inland saltgrass, western wheatgrass, and greasewood. If range condition declines as a result of overgrazing, inland saltgrass, greasewood, and tall rabbitbrush increase. If continued deterioration is allowed, cheatgrass, Russian thistle, kochia, halogeton, and pepperweed invade. The average annual production of air-dry vegetation is about 700 pounds per acre. Brush management can improve deteriorated areas of range that are producing more woody shrubs than were present in the potential plant community. If the range vegetation has seriously deteriorated, seeding is needed. Suitable seeding mixtures can include western wheatgrass and alkali sacaton. Suitable introduced species that can be used for pasture include crested wheatgrass and tall wheatgrass. The plants selected for seeding should meet the seasonal requirements of livestock, wildlife, or both. Seeding late in fall helps to ensure establishment of seedlings the following spring when the content of moisture in the soil is more likely to be adequate. Suitable management practices include proper grazing use, deferred grazing, and a planned grazing system.

If this unit is used for development of mineral resources, the main limitations are the shrink-swell potential, piping, slow permeability, and low strength. Deep gullies are common throughout most mapped areas of this soil. Gullies limit the use of equipment.

This soil is a poor source of reconstruction material for drastically disturbed areas because of excess lime.

The capability classification is 7e, nonirrigated. This soil is in the Salt Flats ecological site #262.

9—Bookcliff-Utso, cool, complex, 3 to 25 percent slopes

This map unit is on ridges and shoulders. The native vegetation is mainly shrubs and grasses with a scattering of Rocky Mountain Douglas-fir, twoneedle pinyon, and Rocky Mountain juniper. Elevation is 7,800 to 8,600 feet. The average annual precipitation is 16 to 20 inches, the average annual air temperature is 40 to 43 degrees F, and the average frost-free period is 60 to 90 days.

This unit is 45 percent Bookcliff loam and 40 percent Utso channery loam. The two soils occur as areas so intricately intermingled that mapping them separately was not practical at the scale used.

Included in mapping are small areas of soils that are similar to the Utso soil but have bedrock at a depth of less than 40 inches.

The Bookcliff soil is deep and well drained. It formed in residuum derived dominantly from calcareous sandstone. Typically, the surface layer is dark grayish brown loam about 2 inches thick. The upper 16 inches of the subsoil is brown loam. The next 18 inches is pale brown gravelly loam. Below this is very pale brown cobbly loam about 6 inches thick. The lower part of the subsoil to a depth of 60 inches or more is pale brown very cobbly loam.

Permeability is moderately slow in the Bookcliff soil. The available water capacity is moderate. The effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate to very severe.

The Utso soil is deep and well drained. It formed in colluvium and residuum derived dominantly from sandstone or shale. Typically, the upper 4 inches of the surface layer is very dark grayish brown channery loam. The lower 7 inches is dark grayish brown very channery loam. The subsoil to a depth of 60 inches or more is grayish brown very channery loam. Highly fractured, hard, platy shale commonly occurs at a depth of 40 to 60 inches.

Permeability is moderate in the Utso soil. The available water capacity is low. The effective rooting depth is 40 to more than 60 inches. Runoff is medium, and the hazard of water erosion is moderate to very severe.

This unit is used for livestock grazing or as wildlife habitat.

The potential plant community is mainly Arizona fescue, big bluegrass, western wheatgrass, and mountain big sagebrush. If range condition declines as a result of overgrazing, mountain snowberry, mountain big sagebrush, and Columbia needlegrass increase. The average annual production of air-dry vegetation is 1,500 pounds per acre. If the range is overgrazed, the proportion of preferred forage plants decreases and the proportion of less preferred forage plants increases. Therefore, livestock grazing should be managed so that the desired balance of preferred species is maintained in the plant community.

Range seeding is suitable if the range is in poor condition. The plants selected for seeding should meet the seasonal requirements of livestock, wildlife, or both. Suitable seeding mixtures can include Arizona fescue, western wheatgrass, and nodding brome. Grasses suitable for pasture include smooth brome, pubescent wheatgrass, and intermediate wheatgrass. Brush management can improve deteriorated areas of range that are producing more woody shrubs than

were present in the potential plant community. Suitable management practices include proper grazing use, deferred grazing, and a planned grazing system.

These soils are a good source of reconstruction material for drastically disturbed areas.

The capability classification of this map unit is 7e, nonirrigated. The unit is in the Mountain Loam ecological site #228.

10—Borollic Calciorthids, 25 to 50 percent slopes

These moderately deep and deep, well drained soils are on side slopes and toeslopes. They formed in colluvium derived dominantly from mixed sedimentary rocks. The native vegetation is mainly brush with scattered twoneedle pinyon and juniper. Elevation is 7,000 to 8,000 feet. This unit is on south, southeast, and southwest exposures. The average annual precipitation is 15 to 20 inches, the average annual air temperature is 40 to 46 degrees F, and the average frost-free period is 85 to 110 days.

Typically, the surface layer is dark grayish brown loam about 4 inches thick. The upper part of the subsoil is dark brown clay loam about 7 inches thick. The lower part to a depth of 60 inches or more is very pale brown silt loam.

Included in mapping are areas of soils that are similar to the Borollic Calciorthids but have accumulations of calcium and carbonates and soils that are shallow over sandstone or shale and are finer textured than the Borollic Calciorthids. Also included are small areas of Hesperus loam and Pagoda clay loam.

Permeability is moderately slow in the Borollic Calciorthids. The available water capacity is high. The effective rooting depth is 30 to more than 60 inches. Runoff is rapid, and the hazard of water erosion is very severe.

This unit is used as wildlife habitat or for livestock grazing.

Plant species in areas of this unit include Gambel's oak, true mountain mahogany, and Saskatoon serviceberry and an understory of big bluegrass and western wheatgrass. If the condition of the range deteriorates, forbs and shrubs will increase.

This unit is too steep for the application of any mechanical conservation practices.

These soils are only a fair source of reconstruction material for drastically disturbed areas. They have excess lime and erode easily.

The capability classification is 7e, nonirrigated. The ecological site is similar to Brushy Loam #238.

11—Borpark stony loam, 40 to 75 percent slopes

This deep, well drained soil is on stony breaks. It formed in colluvium derived dominantly from basalt and shale. The native vegetation is mainly twoneedle pinyon, Rocky Mountain juniper, shrubs, and grasses. Elevation is 5,800 to 7,000 feet. The average annual precipitation is 16 to 20 inches, the average annual air temperature is 40 to 46 degrees F, and the average frost-free period is 85 to 110 days.

Typically, the surface layer is brown stony loam about 2 inches thick. The upper part of the subsoil is brown cobbly clay loam about 6 inches thick. The next part is pale brown very cobbly clay loam about 33 inches thick. The lower part, to a depth of about 60 inches, is extremely cobbly silt loam. The substratum to a depth of 66 inches or more is light brownish gray extremely stony sandy loam.

Included in mapping are small areas of soils that are similar to the Borpark soil but are finer textured, have a thinner surface horizon, or contain fewer coarse fragments. Included areas make up about 30 percent of the total acreage of this unit.

Permeability is moderately slow in the Borpark soil. The available water capacity is low. The effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is very severe.

This unit is used as watershed or as wildlife habitat.

The potential plant community includes Gambel's oak, Indian ricegrass, western wheatgrass, Saskatoon serviceberry, prairie Junegrass, and mountain big sagebrush. The average annual production of air-dry vegetation is about 1,500 pounds per acre.

This unit is too steep for the application of any mechanical conservation practices.

This soil is a poor source of reconstruction material for drastically disturbed areas because of large stones.

The capability classification is 7e, nonirrigated. This soil is in the Brushy Loam ecological site #238.

12—Bunkwater very fine sandy loam, 1 to 8 percent slopes

This deep, well drained soil is on structural benches. It formed in eolian material derived dominantly from mixed materials. The native

vegetation is mainly greasewood, sagebrush, grasses, and forbs. Elevation is 5,000 to 6,000 feet. The average annual precipitation is 10 to 12 inches, the average annual air temperature is 46 to 52 degrees F, and the average frost-free period is 100 to 150 days.

Typically, the surface layer is pink very fine sandy loam about 2 inches thick. The upper 5 inches of the subsoil is reddish brown clay loam. The next 6 inches is light reddish brown clay loam. Below this is light reddish brown clay loam about 20 inches thick. The upper part of the subsoil is light brown clay loam about 9 inches thick. The lower part to a depth of 60 inches or more is light brown silty clay loam.

Included in mapping are small areas of Barx loam and Travessilla fine sandy loam. Also included are small areas of soils that are similar to the Bunkwater soil but are moderately deep to sandstone.

Permeability is moderately slow in the Bunkwater soil. The available water capacity is moderate. The effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is severe.

This unit is used for livestock grazing or as wildlife habitat.

The potential plant community is mainly western wheatgrass, galleta, greasewood, shadscale saltbush, and Wyoming big sagebrush. If range condition declines as a result of overgrazing, greasewood and Wyoming big sagebrush will increase. The average annual production of air-dry vegetation is about 500 pounds per acre.

Range seeding is suitable if the range is in poor condition. It is difficult to establish plants in areas where the surface layer has been removed, exposing the strongly alkaline subsoil. Plants that tolerate salt and droughtiness should be selected. Seeding late in fall helps to ensure establishment of seedlings the following spring when the content of moisture in the soil is more likely to be adequate. Native species that can be seeded in areas of this unit are western wheatgrass, sand dropseed, galleta, and shadscale saltbush. Introduced grasses that may be considered for use in a seed mixture are tall wheatgrass, pubescent wheatgrass, and crested wheatgrass. The plants selected for seeding should meet the seasonal requirements of livestock, wildlife, or both. Brush management can improve deteriorated areas of range that are producing more woody shrubs than were present in the potential plant community. Suitable management practices are proper grazing use, deferred grazing, and a planned grazing system.

This soil is a poor source of reconstruction material for drastically disturbed areas because of excessive sodium.

The capability classification is 7s, nonirrigated. This soil is in the Alkaline Slopes ecological site #297.

13—Caballo very channery loam, 40 to 80 percent slopes

This deep, well drained soil is on side slopes. It formed in colluvium and residuum derived dominantly from mixed sedimentary rocks. The native vegetation is mainly Rocky Mountain Douglas-fir, shrubs, grasses, and forbs. Elevation is 8,000 to 8,700 feet. The average annual precipitation is 21 to 25 inches, the average annual air temperature is 36 to 40 degrees F, and the average frost-free period is 65 to 90 days.

Typically, the surface layer is dark brown very channery loam about 6 inches thick. The upper 12 inches of the subsoil is dark brown very channery loam. The lower 18 inches of the subsoil is brown extremely channery loam. The substratum is pale brown extremely channery loam about 8 inches thick. Weathered bedrock is at a depth of about 44 inches.

Included in mapping are small areas of soils that are similar to the Caballo soil but are moderately deep and may or may not have a dark surface layer; small areas of Adel clay loam; and small areas of soils that are less than 20 inches deep and have a light-colored surface layer.

Permeability is moderate in the Caballo soil. The available water capacity is very low. Runoff is rapid, and the hazard of water erosion is very severe.

This unit is used as wildlife habitat.

The potential vegetation is mainly common juniper, elk sedge, kinnikinnick, and Saskatoon serviceberry and an overstory of Rocky Mountain Douglas-fir. Forage production of the existing community is about 400 pounds of air-dry vegetation per acre.

This unit is too steep for the application of any mechanical conservation practices.

This unit is marginally suited to the production of wood products. The site index for Rocky Mountain Douglas-fir ranges from 58 to 70. Based on a site index of 64 for Rocky Mountain Douglas-fir, this soil can produce 50 cubic feet of wood per acre per year. The main concerns affecting the production and harvesting of timber are the slope and the restricted available water capacity. Minimizing the risk of erosion is essential when timber is harvested, and specialized logging equipment is needed.

This soil is a good source of reconstruction material for drastically disturbed areas.

This soil is in the Rocky Mountain Douglas-Fir ecological site.

14—Callings loam, 1 to 10 percent slopes

This deep, well drained soil is on mesa tops. It formed in glacial till derived dominantly from basalt and modified by loess. The native vegetation is mainly Engelmann's spruce and subalpine fir and a sparse understory of shrubs and forbs. Elevation is 9,900 to 10,050 feet. The average annual precipitation is 25 to 30 inches, the average annual air temperature is 36 to 40 degrees F, and the average frost-free period is 50 to 60 days.

Typically, the surface layer is brown loam about 11 inches thick. The subsurface layer is light brownish gray loam about 4 inches thick. The upper part of the subsoil is brown very cobbly clay about 31 inches thick. The lower part to a depth of 60 inches or more is brown very cobbly clay.

Included in mapping are small areas of soils that are similar to the Callings soil but do not have a dark surface layer.

Permeability is slow in the Callings soil. The available water capacity is moderate. The effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is moderate or severe.

This unit is used for livestock grazing or as wildlife habitat.

The potential plant community is mainly Engelmann's spruce and subalpine fir and an understory of elk sedge, grouse whortleberry, boxleaf myrtle, and silvery lupine. The average annual production of air-dry vegetation is about 400 pounds per acre.

This soil is suited to the production of Engelmann's spruce. The site index for Engelmann's spruce ranges from 70 to 85. Based on a site index of 77 for Engelmann's spruce, this soil can produce 72 cubic feet of wood per acre per year. The main concerns affecting the production and harvesting of timber are the content of rock fragments, the restricted permeability, and the limited water-holding capacity.

The capability classification is 7e, nonirrigated. This soil is in the Engelmann's Spruce/Subalpine Fir ecological site.

15—Cameo fine sandy loam, 1 to 6 percent slopes

This deep, well drained soil is on flood plains and low terraces. It formed in calcareous, stratified alluvium derived dominantly from mixed material. The native vegetation is mainly shrubs and grass. Elevation is 5,800 to 7,000 feet. The average annual precipitation is 12 to 16 inches, the average annual air temperature is 50 to 54 degrees F, and the average frost-free period is 100 to 125 days.

Typically, the surface layer is very pale brown fine sandy loam about 4 inches thick. The underlying material to a depth of 60 inches or more is light yellowish brown, stratified sandy loam and loamy sand.

Included in mapping are small areas of Torriorthents and Panitchen loam. Included areas make up about 10 percent of the total acreage of this unit.

Permeability is moderately rapid in the Cameo soil. The available water capacity is moderate. The effective rooting depth is 60 inches or more. Runoff is slow or medium, and the hazard of water erosion is slight or moderate. This unit is subject to rare flooding for brief periods.

This unit is used mainly for grazing or as wildlife habitat. It also is used for irrigated pasture.

The potential plant community is mainly alkali sacaton, basin wildrye, galleta, fourwing saltbush, and basin big sagebrush. If range condition declines as a result of overgrazing, shrubs are the principal increasers. If continued deterioration is allowed, cheatgrass, kochia, and Russian thistle will invade. The loss of adequate cover in areas of this unit can result in severe gully erosion. The average annual production of air-dry vegetation is about 2,000 pounds per acre. Brush management can improve deteriorated areas of range that are producing more woody shrubs than were present in the potential plant community. If the range vegetation has seriously deteriorated, seeding is needed. Suitable seeding mixtures include western wheatgrass, basin wildrye, Indian ricegrass, and alkali sacaton. Introduced plants that may be seeded include tall wheatgrass and crested wheatgrass. The plants selected for seeding should meet the seasonal requirements of livestock, wildlife, or both. Seeding late in fall helps to ensure establishment of seedlings the following spring when the content of moisture in the soil is more likely to be adequate. Suitable management practices include proper grazing use, deferred grazing, and a planned grazing system.

This unit is well suited to hay and pasture. If the unit is used for hay and pasture, the main limitations are the low available water capacity and the roughness of the landscape. Leveling helps to ensure the uniform application of water. Proper grazing practices, weed control, and fertilizer are needed to ensure maximum quality of forage. Because of the moderately rapid permeability in this soil, adjusting the length of runs is necessary to permit adequate infiltration of water.

This soil is only a fair source of reconstruction material for drastically disturbed areas because of excess lime.

The capability classification is 3e, irrigated, and 6e, nonirrigated. This soil is in the Saltdesert Overflow ecological site #407.

16—Castino-Skisams-Winnemucca loams, 1 to 10 percent slopes, stony

This map unit is on Grand Mesa. The native vegetation is mainly sagebrush, cinquefoil, grass, and forbs. Elevation is 9,900 to 10,000 feet. The average annual precipitation is 25 to 30 inches, the average annual air temperature is 36 to 40 degrees F, and the average frost-free period is 60 to 70 days.

This unit is about 40 percent Castino soil, 25 percent Skisams soil, and 20 percent Winnemucca soil. The three soils occur as areas so intricately intermingled that mapping them separately was not practical at the scale used.

Typically, about 0.05 percent of the surface is covered with stones that are spaced 25 to 75 feet apart.

Included in mapping are small areas of soils that are similar to the major soils but have fewer coarse fragments in the profile. Included areas make up about 15 percent of the total acreage of this unit.

The Castino soil is moderately deep and is well drained. It formed in mixed eolian material over residuum derived from basalt. Slope ranges from 1 to 10 percent. Typically, the surface layer is dark brown loam about 16 inches thick. The upper part of the subsoil is yellowish brown cobbly clay loam about 5 inches thick. The next part is brown very cobbly clay loam about 8 inches thick. The lower part is brown very cobbly clay about 9 inches thick. Basalt is at a depth of about 38 inches.

Permeability is slow in the Castino soil. The available water capacity is low. The effective rooting depth is 20 to 40 inches. Runoff is medium, and the hazard of water erosion is moderate. Water perches on top of the subsoil during spring and early summer.

The Skisams soil is shallow and well drained. It formed in eolian material and residuum derived dominantly from mixed sources. Slope ranges from 1 to 10 percent. The surface layer is dark brown loam about 15 inches thick. The subsoil is pale brown gravelly loam about 4 inches thick. Basalt is at a depth of about 19 inches.

Permeability is moderate in the Skisams soil. The available water capacity is very low. The effective rooting depth is 5 to 20 inches. Runoff is medium, and the hazard of water erosion is moderate. Water is perched on the bedrock during the spring and early summer.

The Winnemucca soil is deep and moderately well drained. It formed in mixed eolian material over residuum derived from basalt. Slope ranges from 1 to 10 percent. Typically, the surface layer is dark grayish brown loam about 19 inches thick. The upper part of the subsoil is light yellowish brown cobbly clay loam about 9 inches thick. The lower part is brown very cobbly clay about 22 inches thick. The substratum to a depth of 60 inches or more is brown clay.

Permeability is slow in the Winnemucca soil. The available water capacity is moderate. The effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate. Water perches on top of the subsoil during the spring and early summer.

This unit is used for livestock grazing, wildlife habitat, or recreational purposes.

The potential plant community on the Castino and Winnemucca soils is mainly nodding brome, sheep fescue, slender wheatgrass, tufted hairgrass, and red fescue. If the range condition declines as a result of overgrazing, forbs and shrubby cinquefoil respond as increasers. If continued deterioration is allowed, houndstongue, prostrate knotweed, rabbitbrush, and annual forbs invade. The average annual production of air-dry vegetation is about 2,300 pounds per acre.

The potential plant community on the Skisams soil is mainly Letterman's needlegrass, muttongrass, Columbia needlegrass, Arizona fescue, prairie sagewort, and silver sagebrush. If range condition declines as a result of overgrazing, muttongrass, silver sagebrush, and prairie sagewort will increase. If continued deterioration is allowed, slimstem muhly, blue grama, pingue hymenoxys, and broom snakeweed invade. The average annual production of air-dry vegetation is about 1,000 pounds per acre.

Management of this map unit requires the maintenance of desirable vegetation and production, since seeding has only limited success because of cold temperatures. If the range is overgrazed, the proportion of preferred forage plants decreases and the proportion of less preferred forage plants increases. Therefore, livestock grazing should be managed so that the desired balance of preferred species is maintained in the plant community. Suitable management practices include proper grazing use, deferred grazing, and a planned grazing system.

The Castino and Winnemucca soils are a poor source of reconstruction material for drastically

disturbed areas because of large stones and a high content of clay. The Skisams soil is a poor source of reconstruction material because of the large stones.

The capability classification of the Skisams soil is 6s, irrigated, and 6e, nonirrigated. The capability classification of the Castino and Winnemucca soils is 6e, nonirrigated. The Castino and Winnemucca soils are in the Wet Subalpine ecological site #253, and the Skisams soil is in the Shallow Subalpine ecological site #251.

17—Cathedral-Veatch complex, 25 to 85 percent slopes

This map unit is on mountain slopes and benches. The native vegetation is mainly shrubs, forbs, and grasses. Elevation is 6,200 to 8,500 feet. The average annual precipitation is 16 to 20 inches, the average annual air temperature is 42 to 44 degrees F, and the average frost-free period is 85 to 100 days.

This unit is about 40 percent Cathedral very stony sandy loam and 40 percent Veatch loam. The Cathedral soil is on the steeper mountainsides, and the Veatch soil is on benches and in the less sloping areas. The Cathedral and Veatch soils occur as areas so intricately intermingled that mapping them separately was not practical at the scale used.

Included in mapping is Hesperus loam and Empedrado loam. The Hesperus soil is on alluvial fans and in the less sloping areas, and the Empedrado soil is on alluvial fans, benches, and valley side slopes. The Hesperus soil makes up about 10 percent of the total acreage of this unit, and the Empedrado soil makes up about 10 percent.

The Cathedral soil is shallow and well drained. It formed in residuum derived dominantly from sandstone. Slope ranges from 25 to 85 percent. Typically, the surface is covered with a mat of leaves about 1 inch thick. The surface layer is dark grayish brown very stony sandy loam about 5 inches thick. The subsoil is grayish brown very gravelly sandy loam about 6 inches thick. Hard sandstone is at a depth of about 11 inches.

Permeability is moderate in the Cathedral soil. The available water capacity is very low. The effective rooting depth is 8 to 20 inches. Runoff is medium, and the hazard of water erosion is very severe.

The Veatch soil is moderately deep and is well drained. It formed in residuum derived dominantly from sandstone. Slope ranges from 25 to 50 percent. Typically, the surface layer is dark grayish brown loam about 6 inches thick. The upper part of the subsoil also is dark grayish brown loam. It is about 5 inches thick. Below this is 21 inches of pale brown very channery sandy loam. Sandstone is at a depth of about 32 inches.

Permeability is moderate in the Veatch soil. The available water capacity is low. The effective rooting depth is 20 to 40 inches. Runoff is medium, and the hazard of water erosion is very severe.

This unit is used for livestock grazing or as winter habitat for mule deer.

The potential plant community on the Cathedral soil is mainly Gambel's oak, bluegrasses, mountain brome, and elk sedge. The average annual production of air-dry vegetation is about 2,000 pounds per acre. If range condition declines as a result of overgrazing, rabbitbrush, Kentucky bluegrass, Canada thistle, and cheatgrass increase. The suitability of this unit for range seeding is poor. The main limitations are the slope and the content of channery fragments.

The potential plant community on the Veatch soil is mainly twoneedle pinyon and an understory of elk sedge, bluebunch wheatgrass, muttongrass, and Gambel's oak. If the condition of the understory deteriorates, the proportion of forbs, shrubs, and twoneedle pinyon increases. The average annual production of air-dry understory vegetation is about 500 pounds per acre.

The Veatch soil is suited to the production of firewood. The site index for twoneedle pinyon and juniper ranges from 60 to 80. Based on a site index of 70 for twoneedle pinyon and juniper, this soil can produce 7.0 cubic feet of wood per acre per year. The main concerns affecting the production and harvesting of timber are the slope, the content of coarse fragments, the restricted rooting depth, droughtiness, and excessive runoff. Specialized equipment is needed to harvest timber in areas where the slopes are more than 35 percent.

Suitable management practices in areas of this unit include proper range use, deferred grazing, and a planned grazing system.

The Cathedral soil is only a fair source of reconstruction material for drastically disturbed areas because of the low available water capacity and the large stones. The upper 12 inches of the Veatch soil is a good source of reconstruction material. Below this depth and above the bedrock, however, this soil is only a fair source because of excess lime and the large stones.

The capability classification of this map unit is 7e, nonirrigated. The Cathedral soil is in the Brushy Loam ecological site #238, and the Veatch soil is in the Mountain Pinyon ecological site #448.

18—Cerro silty clay loam, 2 to 6 percent slopes

This deep, well drained soil is on foothills. It formed in colluvium and residuum derived dominantly from marine shales of the Wasatch Formation. Individual areas are irregularly shaped and range from 20 to 300 acres in size. The native vegetation is mainly small shrubs and grasses and forbs. Elevation is 6,600 to 7,000 feet. The average annual precipitation is about 16 inches, the average annual air temperature is about 41 degrees F, and the average frost-free period is 80 to 90 days.

Typically, the surface layer is grayish brown and brown silty clay loam about 7 inches thick. The upper 28 inches of the subsoil is brown and light yellowish brown silty clay loam and silty clay. The lower 9 inches of the subsoil is very pale brown silty clay loam. The substratum to a depth of 60 inches or more is variegated, light-colored silty clay loam.

Included in mapping are small areas of Pagoda clay loam and Wrayha gravelly sandy loam. Also included are small areas of soils that are similar to Wrayha gravelly sandy loam but are moderately deep to shale. Included areas make up about 20 percent of the total acreage of this unit. The percentage varies from one mapped area to another.

Permeability is slow in the Cerro soil. The available water capacity is high. The effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

This unit is used mainly for irrigated pasture, alfalfa, or small grain. It also is used for livestock grazing.

The potential plant community is mainly western wheatgrass, slender wheatgrass, Letterman's needlegrass, mountain big sagebrush, mule-ears, and muttongrass. Plants that increase when overgrazing occurs include mountain big sagebrush, Saskatoon serviceberry, and mule-ears. Plants that invade in areas of this soil include tall rabbitbrush, Kentucky bluegrass, houndstongue, and cheatgrass. The average annual production of air-dry vegetation is about 2,000 pounds per acre. If the range is overgrazed, the proportion of preferred forage plants decreases and the proportion of less preferred forage plants increases. Therefore, livestock grazing should be managed so that the desired balance of preferred species is maintained in the plant community.

Range seeding is suitable if the range is in poor condition. Species that can be included in a grass mixture include western wheatgrass, muttongrass, and Letterman's needlegrass. Brush management can improve deteriorated areas of range that are producing more woody shrubs than were present in the potential plant community. Suitable management practices include proper grazing use, deferred grazing, and a planned grazing system.

This soil is well suited to hay and pasture. The main limitation is the short growing season. Grazing when the soil is wet results in compaction of the surface layer, poor tilth, and excessive runoff. Applying nitrogen fertilizer promotes good growth of forage plants. Periodic mowing and clipping can help to maintain uniform growth, discourage selective grazing, and reduce clumpy growth.

This soil is well suited to small grain crops. Few limitations affect this use. Furrow or sprinkler irrigation is suitable. If furrow or corrugation irrigation systems are used, runs should be on the contour or across the slope. Irrigation water should be applied at a rate that ensures optimum growth and minimizes deep percolation, runoff, and erosion. Applying the water at a slow rate over a long period helps to ensure that the root zone is properly wetted. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes, or grass-legume mixtures help to maintain fertility and tilth. Soil blowing can be controlled by keeping the soil rough and cloddy when it is not protected by vegetation.

If this soil is used for homesite development, the main limitation is the shrink-swell potential.

This soil is only a fair source of reconstruction material for drastically disturbed areas because of a high content of clay.

The capability classification is 4e, nonirrigated. This soil is in the Deep Clay Loam ecological site #247.

19—Cerro silty clay loam, 6 to 12 percent slopes

This deep, well drained soil is on foothills. It formed in colluvium and residuum derived dominantly from marine shales of the Wasatch Formation. Individual areas are irregularly shaped and range from 20 to 800 acres in size. The native vegetation is mainly small shrubs and grasses and forbs. Elevation is 6,600 to 7,000 feet. The average annual precipitation is about 16 inches, the average annual air temperature is about 41 degrees F, and the average frost-free period is 80 to 90 days.

Typically, the surface layer is grayish brown and brown silty clay loam about 7 inches thick. The upper 28 inches of the subsoil is brown and light yellowish brown silty clay loam and silty clay. The lower 9 inches of the subsoil is very pale brown silty clay loam. The substratum to a depth of 60 inches or more is variegated, light-colored silty clay loam.

Included in mapping are small areas of Pagoda clay

loam and Wrayha gravelly sandy loam. Also included are small areas of soils that are similar to Wrayha gravelly sandy loam but are moderately deep to shale. Included areas make up about 30 percent of the total acreage of this unit. The percentage varies from one mapped area to another.

Permeability is slow in the Cerro soil. The available water capacity is high. The effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used mainly for irrigated pasture, alfalfa, or small grain. It also is used for livestock grazing.

The potential plant community is mainly western wheatgrass, slender wheatgrass, Letterman's needlegrass, mountain big sagebrush, mule-ears, and muttongrass. If overgrazing occurs, mountain big sagebrush, Saskatoon serviceberry, and mule-ears will increase. Plants that will invade include tall rabbitbrush, Kentucky bluegrass, houndstongue, and cheatgrass. Livestock grazing should be managed so that the desired balance of preferred species is maintained in the plant community. The average annual production of air-dry vegetation is about 2,000 pounds per acre.

Range seeding is suitable if the range is in poor condition. Species that can be included in a grass mixture include western wheatgrass, Letterman's needlegrass, and muttongrass. Brush management can improve deteriorated areas of range that are producing more woody shrubs than were present in the potential plant community. Suitable management practices include proper grazing use, deferred grazing, and a planned grazing system.

This soil is moderately well suited to alfalfa, grass-legume hay, and small grain crops. It is limited mainly by the slope and the short growing season. In summer, irrigation is needed for maximum production of most crops. Sprinkler irrigation can be used, but water should be applied slowly so that runoff is minimized. Sprinkler irrigation is the most suitable method of applying water. This method permits the even, controlled application of water, reduces the runoff rate, and minimizes the risk of erosion. Excessive cultivation can result in the formation of a tillage pan. This pan can be broken by subsoiling when the soil is dry. Returning crop residue to the soil or regularly adding other organic matter improves fertility, minimizes crusting, and increases the rate of water intake. Crop residue left on or near the surface conserves moisture, maintains tilth, and helps to control erosion. Limiting tillage for seedbed preparation and for weed control reduces the runoff rate and the hazard of erosion. All tillage should be on the contour or across the slope. Erosion can be controlled by seeding fall grain early, using stubble-mulch tillage, and tilling and seeding on the contour or across the slope. Also, waterways should be shaped and seeded to perennial grass.

This soil is suited to windbreaks and environmental plantings. The main limitations are clayey textures and the restricted permeability. Supplemental irrigation may be needed during planting and during dry periods. Planting on the contour can conserve moisture. Trees that are suitable for planting include Rocky Mountain juniper, twoneedle pinyon, green ash, honeylocust, and Russian-olive. Suitable shrubs include Hansen hedgerose and lilac.

This soil is poorly suited to homesite development. The main limitations are a high shrink-swell potential and the susceptibility to earth slippage. Cutbanks are not stable and are subject to slumping. Concentration of water in cracks after the soil dries can result in the formation of rills in exposed cuts. Septic tank absorption fields do not function properly during rainy periods because of wetness and the restricted permeability. Using sandy backfill for the trench and using long absorption lines help to compensate for the restricted permeability. Effluent from septic tank absorption fields can surface in downslope areas and thus create a hazard to health. The design of access roads should provide adequate cut-slope grade, and drains are needed to control surface runoff and keep soil losses to a minimum. The effects of shrinking and swelling can be minimized by using proper engineering designs and by backfilling with material that has a low shrink-swell potential.

The capability classification is 4e, nonirrigated. This soil is in the Deep Clay Loam ecological site #247.

20—Cerro silty clay loam, 12 to 25 percent slopes

This deep, well drained soil is on foothills and old mudflows. It formed in colluvium and residuum derived dominantly from marine shales of the Wasatch Formation. Slope ranges from 12 to 25 percent. Aspect is mostly southerly. The native vegetation is mainly shrubs, grasses, and forbs. Elevation is 7,500 to 8,000 feet. The average annual precipitation is about 20 inches, the average annual air temperature is about 41 degrees F, and the average frost-free period is about 90 days.

Typically, the surface layer is grayish brown and brown silty clay loam about 7 inches thick. The upper 28 inches of the subsoil is brown silty clay loam and light yellowish brown silty clay. The lower 9 inches of the subsoil is very pale brown silty clay loam. The

substratum to a depth of 60 inches or more is variegated light yellowish brown, very pale brown, pink, and white silty clay loam.

Included in mapping are small areas of Fughes clay loam, Wrayha gravelly sandy loam, and Pagoda clay loam. Also included are small areas of soils that are similar to the Fughes and Pagoda soils but have a dark surface layer less than 16 inches thick and small areas of soils that are similar to Wrayha gravelly sandy loam but are moderately deep to shale or sandstone. Included areas make up about 20 percent of the total acreage of this unit. The percentage varies from one mapped area to another.

Permeability is slow in the Cerro soil. The available water capacity is high. The effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is severe. This soil is subject to distinct cracking whenever it dries.

This unit is used for livestock grazing or as wildlife habitat.

The potential plant community is mainly western wheatgrass, slender wheatgrass, Letterman's needlegrass, muttongrass, mule-ears, and mountain big sagebrush. If retrogression is cattle induced, mountain big sagebrush, Saskatoon serviceberry, and mule-ears increase. If a decline in condition continues, rabbitbrush, Kentucky bluegrass, houndstongue, and stickseed invade. Average annual air-dry production is about 2,000 pounds per acre. Suitable management practices include proper grazing use, deferred grazing, and a planned grazing system.

This soil is only a fair source of reconstruction material for drastically disturbed areas because of a high content of clay.

The capability classification is 6e, nonirrigated. This soil is in the Deep Clay Loam ecological site #247.

21—Chipeta silty clay loam, 3 to 30 percent slopes

This shallow, well drained soil is on low, rolling hills, ridges, and toeslopes. It formed in residuum derived dominantly from calcareous, gypsiferous shale. The native vegetation is mainly sparse stands of salt-tolerant desert shrubs and grasses. Elevation is 5,100 to 5,800 feet. The average annual precipitation is 6 to 10 inches, the average annual air temperature is 47 to 52 degrees F, and the average frost-free period is 125 to 160 days.

Typically, the surface layer is light brownish gray silty clay loam about 4 inches thick. The underlying material is silty clay about 9 inches thick. Weathered shale is at a depth of about 13 inches. Depth to shale ranges from 10 to 20 inches.

Included in mapping are small areas of Billings silty clay loam, Persayo silty clay loam, and Youngston loam. Also included are small areas of shale outcroppings and soils that are severely gullied and entrenched. Included areas make up about 15 percent of the total acreage of this unit. The percentage varies from one mapped area to another.

Permeability is slow in the Chipeta soil. The available water capacity is very low. The effective rooting depth is 7 to 20 inches. Runoff is rapid, and the hazard of water erosion ranges from moderate to very severe.

Most areas are used for limited livestock grazing.

The potential plant community is mainly Gardner's saltbush, mat saltbush, shadscale saltbush, Indian ricegrass, galleta, western wheatgrass, and bottlebrush squirreltail. If range condition declines as a result of overgrazing, shrubs are the principal increasers. If continued deterioration is allowed, halogeton, cheatgrass, and Russian thistle invade. The average annual production of air-dry vegetation is about 350 pounds per acre. Suitable management practices include proper grazing use, deferred grazing, and a planned grazing system.

If this soil is used for development of mineral resources, the main limitations are low strength and the shrink-swell potential.

This soil is a poor source of reconstruction material for drastically disturbed areas because of a high content of clay.

The capability classification is 7e, nonirrigated. This soil is in the Clayey Saltdesert ecological site #403.

22—Clapper very stony loam, 12 to 25 percent slopes

This deep, well drained soil is on side slopes of mountains. It formed in material weathered from glacial till derived dominantly from basalt and mixed sources. The native vegetation is mainly twoneedle pinyon, juniper, galleta, and wheatgrass. Elevation is 5,600 to 7,100 feet. The average annual precipitation is 12 to 15 inches, the average annual air temperature is 46 to 52 degrees F, and the average frost-free period is 100 to 150 days.

Typically, the surface layer is brown very stony loam about 3 inches thick. The upper 9 inches of the subsoil also is brown very stony loam. The next part of the subsoil is very pale brown very cobbly loam about 14 inches thick. The lower part to a depth of 60 inches or more is light yellowish brown very cobbly loam.

Included in mapping are small areas of Barx loam and soils that do not have developed subsoil layers. Also included are soils that are similar to the Barx soil but have 20 to 35 percent basalt cobbles and stones on the surface or in the profile.

Permeability is moderate in the Clapper soil. The available water capacity is low. The effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is severe.

This unit is used for livestock grazing or as wildlife habitat.

The potential plant community is mainly Utah juniper and an understory of bluebunch wheatgrass, galleta, Sandberg bluegrass, bottlebrush squirreltail, and Wyoming big sagebrush. If range condition declines as a result of overgrazing, the proportion of forbs, shrubs, and juniper increases. The potential production of the native understory vegetation in normal years is about 350 pounds of air-dry vegetation per acre. Suitable management practices include proper grazing use, deferred grazing, and a planned grazing system.

This unit is suited to the production of twoneedle pinyon and juniper. The site index for twoneedle pinyon and juniper ranges from 40 to 50. Based on a site index of 44 for twoneedle pinyon and juniper, this soil can produce less than 3.8 cubic feet of wood per acre per year. The main concerns affecting the production and harvesting of timber are complex slopes, the content of coarse fragments, a low water-holding capacity, rapid runoff, and the severe hazard of erosion. Stones on the surface can interfere with felling, yarding, and other activities involving the use of equipment. Leaving high juniper stumps with several small live branches promotes the growth of post crops.

This soil is a poor source of reconstruction material for drastically disturbed areas because of the large stones throughout the profile.

The capability classification is 7e, nonirrigated. This soil is in the Foothill Juniper ecological site #447.

23—Clapper very stony loam, 25 to 65 percent slopes

This deep, well drained soil is on foothill slopes. It formed in material weathered from glacial till derived dominantly from basalt and mixed sources. The native vegetation is mainly twoneedle pinyon and juniper and an understory of shrubs and grass. Elevation is 5,600 to 7,100 feet. The average annual precipitation is 12 to 15 inches, the average annual air temperature is 46 to 52 degrees F, and the average frost-free period is 100 to 150 days.

Typically, the surface layer is brown very stony loam about 3 inches thick. The upper 9 inches of the subsoil also is brown very stony loam. The next part of the subsoil is very pale brown very cobbly loam about 14 inches thick. The lower part to a depth of 60 inches or more is light yellowish brown very cobbly loam.

Included in mapping are small areas of Barx loam. Also included are soils that are similar to the Barx soil but have 20 to 35 percent basalt cobbles and stones on the surface or in the profile.

Permeability is moderate in the Clapper soil. The available water capacity is low. The effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is severe.

This unit is used for livestock grazing or as wildlife habitat.

The potential plant community is mainly Utah juniper and an understory of bluebunch wheatgrass, bottlebrush squirreltail, galleta, Sandberg bluegrass, and Wyoming big sagebrush. If range condition declines as a result of overgrazing, the proportion of forbs, shrubs, and juniper increases. The potential production of the native understory vegetation in normal years is about 350 pounds of air-dry vegetation per acre. Suitable management practices include proper grazing use, deferred grazing, and a planned grazing system.

This unit is suited to the production of twoneedle pinyon and juniper. The site index for twoneedle pinyon and juniper ranges from 85 to 100. Based on a site index of 94 for twoneedle pinyon and juniper, this soil can produce 13.1 cubic feet of wood per acre per year. The main concerns affecting the production and harvesting of timber are the slope; stones, cobbles, and gravel on the surface; a low water-holding capacity; rapid runoff; and the severe hazard of erosion. Specialized logging equipment is needed on slopes of more than 35 percent. Stones on the surface can interfere with felling, yarding, and other activities involving the use of equipment. Leaving high juniper stumps with several small live branches promotes the growth of post crops.

This soil is a poor source of reconstruction material for drastically disturbed areas because of the large stones throughout the profile.

The capability classification is 7e, nonirrigated. This soil is in the Foothill Juniper ecological site #447.

24—Cochetopa-Clayburn complex, 12 to 40 percent slopes

This map unit is on foothills and old mudflows. It formed in colluvium and localized alluvium derived dominantly from shales. The vegetation in areas that

are not cultivated is mainly quaking aspen, shrubs, grasses, and forbs. Elevation is 7,800 to 8,800 feet. The average annual precipitation is 22 to 25 inches, the average annual air temperature is about 39 degrees F, and the average frost-free period is 55 to 70 days.

This unit is about 50 percent Cochetopa soil and 20 percent Clayburn soil. The Clayburn soil is in areas with more sandstone influence or in areas of the more recently deposited alluvium, such as on alluvial fans or in narrow swales. The Cochetopa and Clayburn soils occur as areas so intricately intermingled that mapping them separately was not practical at the scale used.

Included in mapping are small areas of clayey soils that have a thinner surface layer than the major soils or that are calcareous. Also included are small areas, generally on the upper part of narrow ridges, of channery soils or soils that are more sloping than the major soils. Included areas make up about 30 percent of the total acreage of this unit. The percentage varies from one mapped area to another.

The Cochetopa soil is deep and well drained. It formed on hillsides and old mudflows derived dominantly from shale. Typically, the surface layer is dark gray and dark grayish brown clay loam about 20 inches thick. The upper part of the subsoil is dark grayish brown heavy clay loam about 13 inches thick. Below this is yellowish brown clay about 12 inches thick. The lower part of the subsoil is yellowish brown clay loam about 6 inches thick. The substratum to a depth of 60 inches or more is light yellowish brown and pale olive clay loam. In some areas the surface layer is loam.

Permeability is slow in the Cochetopa soil. The available water capacity is moderate. The effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is moderate to very severe.

The Clayburn soil is deep and well drained. It formed on footslopes and toeslopes and in localized sandstone-influenced uplands and backslopes derived dominantly from shale. Typically, the surface layer is grayish brown loam about 13 inches thick. The subsoil is brown clay loam about 33 inches thick. The substratum to a depth of 60 inches or more is light yellowish brown heavy loam.

Permeability is moderately slow in the Clayburn soil. The available water capacity is high. The effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is moderate to very severe.

This unit is used for livestock grazing, wood production, big game habitat, or autumn recreation.

The potential plant community in areas of this unit is mainly quaking aspen and an understory of slender wheatgrass, nodding brome, mountain brome, Columbia needlegrass, and mountain snowberry. The potential production of the native understory vegetation in normal years is about 2,800 pounds of air-dry vegetation per acre. This unit is typically very productive and valuable for livestock grazing. Suitable management practices include proper range use, deferred grazing, and a planned grazing system.

This unit is moderately well suited to quaking aspen. The trees provide firewood of low ash content and serve as cover for large game animals. Because the soils are sticky when wet, most planting and harvesting equipment can be used only during dry periods.

The Cochetopa soil is suited to the production of quaking aspen. The site index for quaking aspen ranges from 58 to 70. Based on a site index of 64 for quaking aspen, this soil can produce 35 cubic feet of wood per acre per year. The main concerns affecting the production and harvesting of timber are the slope, the clayey soil textures, and excessive runoff. The clayey texture of the surface layer limits the use of equipment.

The Clayburn soil also is suited to the production of quaking aspen. The site index for quaking aspen ranges from 65 to 80. Based on a site index of 73 for quaking aspen, this soil can produce 41 cubic feet of wood per acre per year. The main concerns affecting the production and harvesting of timber are the slope and excessive runoff.

The Cochetopa soil is a poor source of reconstruction material for drastically disturbed areas. The Clayburn soil is only a fair source of reconstruction material.

The capability classification of this map unit is 7e, nonirrigated. The unit is in the Quaking Aspen ecological site.

25—Cowestglen sandy loam, 1 to 8 percent slopes

This deep, well drained soil is on flood plains, low terraces, and alluvial fans. It formed in stratified, calcareous alluvium derived dominantly from sedimentary rock. The native vegetation is mainly grass and shrubs. Elevation is 5,800 to 7,200 feet. The average annual precipitation is 12 to 15 inches, the average annual air temperature is 42 to 45 degrees F, and the average frost-free period is 80 to 105 days.

Typically, the surface layer is light brownish gray sandy loam about 6 inches thick. The upper 14 inches of the underlying material is light brownish gray fine

sandy loam. The next 18 inches is light brownish gray loam. The lower part to a depth of 60 inches or more is stratified sandy loam, fine sandy loam, and silt loam.

Included in mapping are small areas of Battlement loam. The extent of these included areas varies from one delineation to another.

Permeability is moderately rapid in the Cowestglen soil. The available water capacity is moderate. The effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight to severe. This unit is subject to rare flooding for brief periods.

Most areas of this unit are used for livestock grazing or as wildlife habitat. A few areas are used for irrigated pasture.

The potential plant community is mainly basin wildrye, western wheatgrass, and basin big sagebrush. If the condition of the range deteriorates, shrubs increase. If the range condition continues to deteriorate, cheatgrass, greasewood, Kentucky bluegrass, cactus, lambsquarter, mustard, and broom snakeweed invade. The average annual production of air-dry vegetation is about 2,000 pounds per acre. Brush management can improve deteriorated areas of range that are producing more woody shrubs than were present in the potential plant community. If the range vegetation has seriously deteriorated, seeding may be needed. Suitable seeding mixtures can include western wheatgrass. Pubescent wheatgrass is an adapted introduced species. The plants selected for seeding should meet the seasonal requirements of livestock, wildlife, or both. Seeding late in fall helps to ensure establishment of seedlings the following spring when the content of moisture in the soil is more likely to be adequate. Suitable management practices include proper grazing use, deferred grazing, and a planned grazing system.

This unit is well suited to hay and pasture. If it is used for hay and pasture, the main limitations are a low available water capacity and the roughness of the landscape. Leveling helps to ensure the uniform application of water. Irrigation water can be applied by furrow or sprinkler methods. Proper grazing practices, weed control, and fertilizer are needed to ensure maximum quality of forage. Because of the moderately rapid permeability in this soil, adjusting the length of runs is necessary to permit adequate infiltration of water.

This soil is only a fair source of reconstruction material for drastically disturbed areas because of excess lime.

This unit is poorly suited to homesite development. The main concern is the hazard of flooding.

The capability classification is 4e, irrigated and nonirrigated. This soil is in the Foothill Swale ecological site #285.

26—Cryochrepts-Cryoborolls-Rubble land complex, 15 to 90 percent slopes

This map unit is on foothills and the backslopes of a higher mesa. Areas are elongated and irregularly shaped and are more than 1,000 acres in size. The native vegetation is mainly Engelmann's spruce, subalpine fir, quaking aspen, and shrubs. Elevation is 8,700 to 10,000 feet. The average annual precipitation is 25 to 30 inches, the average annual air temperature is 35 to 39 degrees F, and the average frost-free period is less than 75 days.

This unit is about 35 percent Cryochrepts, 30 percent Cryoborolls, and 25 percent Rubble land. The components of this map unit occur as areas so intricately intermingled that mapping them separately was not practical at the scale used. The Rubble land is above the Cryochrepts and Cryoborolls on the landscape, but stringers of Rubble land cut across areas of these soils.

Included in mapping is an escarpment of Rock outcrop, which is at an elevation of 9,500 to 10,000 feet. This escarpment is as much as 10 miles long and is generally less than 50 feet wide.

Cryochrepts are deep and well drained. They formed in colluvium from basalt and Green River shale or in colluvium over material weathered from Green River shale. Slope ranges from 15 to 35 percent. Typically, the surface is covered with a mat of needles, stems, and twigs about 3 inches thick. Also, about 10 percent of the surface is covered with stones and boulders. The surface layer is light gray extremely stony loam about 8 inches thick. The subsoil is brown very cobbly loam about 8 inches thick. The substratum to a depth of 60 inches or more is pale brown and light brownish gray very flaggy loam and flaggy clay loam. Depth to bedrock ranges from 24 to more than 60 inches. In some areas the surface layer is fine sandy loam or clay loam in the fine-earth fraction.

Permeability is moderate or moderately slow in the Cryochrepts. The available water capacity is low. The effective rooting depth is 24 to more than 60 inches. Runoff is medium or rapid, and the hazard of water erosion is slight or moderate. Rock fragments reduce the hazard of water erosion.

Cryoborolls are deep and moderately deep and are well drained. They formed in colluvium from basalt and Green River shale or in colluvium over material weathered from Green River shale. Slope ranges from 15 to 35 percent.

Depth, color, clay content, clay development, and

rock content are variable in the Cryoborolls. In a typical area of these soils, about 10 percent of the surface is covered with stones and boulders. The surface layer is very dark gray and grayish brown loam, gravelly loam, and very cobbly loam about 17 inches thick. The subsoil is yellowish brown and light brownish gray very cobbly clay loam and extremely cobbly clay loam about 25 inches thick. The substratum to a depth of 60 inches or more is light brownish gray and pale brown cobbly loam and cobbly clay loam. Depth to bedrock ranges from 24 to more than 60 inches. In some areas the surface layer is fine sandy loam in the fine-earth fraction. In places the surface layer is less than 16 inches thick.

Permeability is moderately slow in the Cryoborolls. The available water capacity is low or moderate. The effective rooting depth is 24 to more than 60 inches. Runoff is medium or rapid, and the hazard of water erosion is slight or moderate. Rock fragments reduce the hazard of water erosion.

Rubble land consists of basalt talus slopes. More than 90 percent of the surface is covered with stones or boulders. Voids on talus slopes are free of soil material, except around the perimeters. Except for lichens, vegetation occurs only around the perimeters of the Rubble land. Areas of Rubble land are commonly just below the basalt cap. Also included in the Rubble land areas are avalanche paths. Avalanche paths have voids filled dominantly with fine earth.

This unit is used for wildlife habitat, watershed, or livestock summer range.

Present vegetation consists of quaking aspen and mixed spruce-fir and a good understory of large shrubs and grasses. Because of the stringers of Rubble land, access by cattle is limited for grazing in areas of this unit. The unit is poorly suited to firewood and softwood lumber because of the restricted accessibility.

This unit is poorly suited to recreational development. It is limited mainly by the large stones and the slope.

This unit is poorly suited to homesite development. The main limitations are the slope and the large stones. Plans for homesite development should provide for the preservation of as many trees as possible. The slope is a concern if septic tank absorption fields are installed. Absorption lines should be installed on the contour. During the rainy season, effluent from onsite sewage disposal systems may seep at points downslope.

The soils in this unit are a poor source of reconstruction material for drastically disturbed areas because of the large stones.

The capability classification of the Cryochrepts and Cryoborolls is 7e, nonirrigated, and that of the Rubble land is 8s, nonirrigated. The Cryochrepts are in the Engelmann's Spruce/Subalpine Fir ecological site, and the Cryoborolls are in the Quaking Aspen ecological site.

27—Cryorthents-Rock outcrop complex, 50 to 90 percent slopes

This map unit is mainly on south- and southeast-facing mountainsides and ridges. The native vegetation is mainly Rocky Mountain Douglas-fir, Gambel's oak, Saskatoon serviceberry, grasses, sedges, and forbs. Elevation is 7,500 to 9,500 feet. The average annual precipitation is 16 to 20 inches, the average annual air temperature is 36 to 40 degrees F, and the average frost-free period is 65 to 90 days.

This unit is about 55 percent Cryorthents and 30 percent Rock outcrop. The two components occur as areas so intricately intermingled that mapping them separately was not practical at the scale used.

Included in mapping are small areas of Irigul channery loam, Parachute loam, Northwater loam, and Adel loam and small areas of shallow soils. Included areas make up about 15 percent of the total acreage of this unit.

Cryorthents commonly are well drained and are moderately deep or deep to hard or soft shale. They formed in residuum and colluvium derived from shale. No single profile is typical of the Cryorthents, but a common profile has a surface layer of grayish brown very channery loam about 3 inches thick. The subsoil is light brownish gray extremely channery loam about 22 inches thick. Shale is at a depth of about 25 inches. Depth to hard shale ranges from 20 to about 38 inches but averages less than 28 inches.

Permeability is moderate in the Cryorthents. The available water capacity is very low. The effective rooting depth is 20 to 40 inches. Runoff is very rapid, and the hazard of water erosion is very severe.

Rock outcrop consists of barren escarpments, ridge caps, rocky points of shale, and small areas of sandstone. The escarpments commonly are 50 to 500 feet high and 100 to 1,500 feet long.

This unit is used as wildlife habitat or watershed.

The potential plant community in areas of this unit includes mountain snowberry, Saskatoon serviceberry, common juniper, kinnikinnick, and scattered Rocky Mountain Douglas-fir. The areas are too steep for the application of any mechanical conservation practices. Also, because the Rocky Mountain Douglas-fir is too scattered and slopes are too steep, the economical gathering of firewood is not feasible (fig. 7).

If this unit is used for development of mineral

Figure 7.—A typical area of Cryorthents-Rock outcrop complex, 50 to 90 percent slopes.

resources, the main limitations are the shallow depth to rock, the areas of Rock outcrop, and the slope. This unit is not stable and is subject to mass movement. Wet areas and sloping rock formations should be identified prior to any construction.

The capability classification of the Cryorthents is 8e, nonirrigated. The Cryorthents are in the Rocky Mountain Douglas-Fir ecological site.

28—Cumulic Haploborolls, 1 to 3 percent slopes

These deep, well drained to somewhat poorly drained soils are on flood plains. They formed in alluvium derived dominantly from the Green River and Wasatch shale formations. The vegetation in areas that are not cultivated is mainly narrowleaf cottonwoods, maples, willows, grasses, and forbs. Elevation is 5,800 to 7,400 feet. The average annual precipitation is 12 to 18 inches, the average annual air temperature is 40 to 46 degrees F, and the average frost-free period is 80 to 110 days.

The content of rock fragments and the content of clay in the subsoil are variable in the Cumulic Haploborolls. Onsite investigation is necessary to determine specific properties.

Typically, the surface layer is dark grayish brown gravelly sandy clay loam about 8 inches thick. The next layer is grayish brown very channery sandy clay loam about 12 inches thick. The subsoil is grayish brown clay loam about 8 inches thick. The upper part of the substratum is light brownish gray very gravelly loamy sand about 16 inches thick. The lower part to a depth of 60 inches or more is yellow very gravelly sand. In some areas the surface layer is loam or silty clay loam.

Included in mapping are small areas of Debeque very channery loam. Also included are small areas of Happle very channery sandy loam and Hesperus loam.

Permeability is moderate or moderately slow in the Cumulic Haploborolls. The available water capacity is low to high. The effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion

is slight. These soils are subject to brief periods of flooding in the spring and summer as a result of intense thunderstorms.

This unit is used for livestock grazing or as wildlife habitat. Areas of the unit can be used for irrigated hay and pasture if irrigation water is made available. Onsite investigation is necessary, however, to determine the suitability of this unit for specific uses.

Plant species in areas of this unit include narrowleaf cottonwood and an understory of western wheatgrass, basin wildrye, basin big sagebrush, and many forbs and shrubs. Total annual production of air-dry vegetation is about 1,000 pounds per acre.

Grasses and legumes grow well if adequate fertilizer is used. Leveling helps to ensure the uniform application of water. Proper grazing, weed control, and fertilizer are needed to ensure maximum quality of forage.

Because of the variability of this unit, onsite investigation is needed to determine its suitability as a source of reconstruction material for drastically disturbed areas.

The capability classification is 4e, nonirrigated. The ecological site is similar to Foothill Swale #285.

29—Debeque very channery loam, 5 to 20 percent slopes

This deep, well drained soil is on toeslopes, in narrow drainageways, and on alluvial fans and old stream terraces. It formed in colluvium and alluvium derived dominantly from the Green River shale formation. The native vegetation is mainly serviceberry, snowberry, grasses, forbs, and scattered Rocky Mountain Douglas-fir. Elevation is 5,800 to 7,500 feet. The average annual precipitation is 12 to 18 inches, the average annual air temperature is 40 to 45 degrees F, and the average frost-free period is 85 to 110 days.

Typically, the surface layer is very dark grayish brown very channery loam about 4 inches thick. The next layer is brown very channery sandy loam about 3 inches thick. The underlying material to a depth of 60 inches or more is light brownish gray very channery sandy loam.

Included in mapping are small areas of Grobutte very channery loam. Also included are small areas of soils that are similar to the Debeque soil but are on the less sloping terraces near streams.

Permeability is moderately rapid in the Debeque soil. The available water capacity is low. The effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is severe.

This unit is used for livestock grazing or as wildlife habitat.

The potential plant community is mainly western wheatgrass, muttongrass, prairie Junegrass, and mountain big sagebrush. If the condition of the range deteriorates, big sagebrush and forbs increase. The average annual production of air-dry vegetation is about 1,500 pounds per acre.

Range seeding is suitable if the range is in poor condition. The main limitation affecting seeding is the slope. Seeding late in fall helps to ensure establishment of seedlings the following spring when the content of moisture in the soil is more likely to be adequate. Adapted native grasses include western wheatgrass, needleandthread, muttongrass, and prairie Junegrass. Introduced grasses that may be considered for seeding are smooth brome and intermediate wheatgrass. The plants selected for seeding should meet the seasonal requirements of livestock, wildlife, or both. Brush management can improve deteriorated areas of range that are producing more woody shrubs than were present in the potential plant community. Suitable management practices include proper range use, deferred grazing, and a planned grazing system.

This soil is only a fair source of reconstruction material for drastically disturbed areas because of excess lime and the low available water capacity.

The capability classification is 6e, nonirrigated. This unit is in the Deep Loam ecological site #292.

30—Debeque-Hesperus complex, 5 to 25 percent slopes

This map unit is on benches, toeslopes, and small fans. The native vegetation is mainly sagebrush, snowberry, Gambel's oak, grasses, forbs, some Rocky Mountain Douglas-fir, and quaking aspen. Elevation is 6,400 to 7,500 feet. The average annual precipitation is 12 to 18 inches, the average annual air temperature is 40 to 45 degrees F, and the average frost-free period is 85 to 110 days.

This unit is about 40 percent Debeque very channery loam and 35 percent Hesperus loam. The two soils occur as areas so intricately intermingled that mapping them separately was not practical at the scale used.

Included in mapping are small areas of soils that are similar to the Debeque soil but have a thicker dark surface layer and are noncalcareous or are finer textured. The extent of these included soils varies from one mapped area to another.

The Debeque soil is deep and well drained. It

formed in colluvium and alluvium derived dominantly from mixed sedimentary material. Slope ranges from 5 to 25 percent. Typically, the surface layer is very dark grayish brown very channery loam about 4 inches thick. The next layer is brown very channery sandy loam about 3 inches thick. The underlying material to a depth of 60 inches or more is light brownish gray very channery sandy loam.

Permeability is moderately rapid in the Debeque soil. The available water capacity is low. The effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is severe.

The Hesperus soil is deep and well drained. It formed in colluvium and alluvium derived dominantly from mixed sedimentary material. Slope ranges from 5 to 15 percent. Typically, the surface layer is very dark gray and dark grayish brown loam about 7 inches thick. The upper part of the subsoil is brown clay loam about 17 inches thick. The lower part is dark yellowish brown clay loam about 13 inches thick. The substratum to a depth of 60 inches or more is brown clay loam.

Permeability is moderately slow in the Hesperus soil. The available water capacity is high. The effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is severe.

This unit is used for livestock grazing or as wildlife habitat.

The potential plant community is mainly Gambel's oak, big bluegrass, nodding brome, elk sedge, Saskatoon serviceberry, and mountain snowberry. The average annual production of air-dry vegetation is about 2,000 pounds per acre. If the range is overgrazed, the proportion of preferred forage plants decreases and the proportion of less preferred forage plants increases. Therefore, livestock grazing should be managed so that the desired balance of preferred species is maintained in the plant community. Suitable management practices include proper range use, deferred grazing, and a planned grazing system.

The Debeque soil is only a fair source of reconstruction material for drastically disturbed areas because of excess lime and the low available water capacity. The Hesperus soil is a good source of this material.

The capability classification of this map unit is 6e, nonirrigated. The unit is in the Brushy Loam ecological site #238.

31—Dominguez clay loam, 1 to 3 percent slopes

This deep, well drained soil is on alluvial fans and toeslopes. It formed in residuum and alluvium derived dominantly from Wasatch shales. The native vegetation is mainly sagebrush, western wheatgrass, and shadscale saltbush. Elevation is 5,000 to 6,400 feet. The average annual precipitation is 12 to 15 inches, the average annual air temperature is 46 to 52 degrees F, and the average frost-free period is 100 to 150 days.

Typically, the surface layer is reddish brown clay loam about 3 inches thick. The upper part of the subsoil is reddish brown clay about 14 inches thick. The next part is reddish gray clay about 13 inches thick. The lower part of the subsoil to a depth of 60 inches or more is pinkish gray clay.

Included in mapping are small areas of Happle very channery sandy loam, Uffens loam, and Panitchen loam.

Permeability is slow in the Dominguez soil. The available water capacity is moderate. The effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

This unit is used for irrigated pasture and hay or for livestock grazing.

Grasses and legumes grow well if adequate fertilizer is used. Leveling helps to ensure the uniform application of water. Proper grazing practices, weed control, and fertilizer are needed for maximum quality of forage.

The potential plant community is mainly western wheatgrass, Salina wildrye, Sandberg bluegrass, Wyoming big sagebrush, and shadscale saltbush. If range condition declines as a result of overgrazing, western wheatgrass, Indian ricegrass, and Salina wildrye will decrease and Wyoming big sagebrush will increase. The average annual production of air-dry vegetation is about 700 pounds per acre.

Range seeding is suitable if the range is in poor condition. Seeding late in fall helps to ensure establishment of seedlings the following spring when the content of moisture in the soil is more likely to be adequate. Adapted native grasses are western wheatgrass and Salina wildrye. Introduced grasses that may be considered in a seed mixture are crested wheatgrass and Russian wildrye. The plants selected for seeding should meet the seasonal requirements of livestock, wildlife, or both. Successful seedings can be expected only in years when precipitation is above average. Suitable management practices include proper range use, deferred grazing, and a planned grazing system.

This soil is a poor source of reconstruction material for drastically disturbed areas because of a high content of clay.

The capability classification is 3s, irrigated, and 4e, nonirrigated. This unit is in the Semidesert Clay Loam ecological site #328.

32—Dominguez clay loam, 3 to 8 percent slopes

This deep, well drained soil is on alluvial fans and toeslopes. It formed in residuum and alluvium derived dominantly from Wasatch shales. The native vegetation is mainly sagebrush, western wheatgrass, and shadscale saltbush. Elevation is 5,000 to 6,400 feet. The average annual precipitation is 12 to 15 inches, the average annual air temperature is 46 to 52 degrees F, and the average frost-free period is 100 to 150 days.

Typically, the surface layer is reddish brown clay loam about 3 inches thick. The upper part of the subsoil is reddish brown clay about 14 inches thick. The next part is reddish gray clay about 13 inches thick. The lower part of the subsoil to a depth of 60 inches or more is pinkish gray clay.

Included in mapping are small areas of Barx loam, Bunkwater very fine sand loam, and Wrayha gravelly loam. Also included are small areas of soils that are similar to the Dominguez soil but are yellow.

Permeability is slow in the Dominguez soil. The available water capacity is moderate. The effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is severe.

This unit is used for livestock grazing.

The potential plant community is mainly western wheatgrass, Salina wildrye, Sandberg bluegrass, Wyoming big sagebrush, and shadscale saltbush. If range condition declines as a result of overgrazing, western wheatgrass, Indian ricegrass, and Salina wildrye will decrease and Wyoming big sagebrush will increase. The average annual production of air-dry vegetation is about 700 pounds per acre.

Range seeding is suitable if the range is in poor condition. Seeding late in fall helps to ensure establishment of seedlings the following spring when the content of moisture in the soil is more likely to be adequate. Adapted native grasses are western wheatgrass and Salina wildrye. Obtaining a source of seed may be difficult for some of these species. Introduced grasses that should be considered in a seed mixture are crested wheatgrass and Russian wildrye. The plants selected for seeding should meet the seasonal requirements of livestock, wildlife, or both. Successful seedings can be expected only in years when precipitation is above average. Suitable management practices include proper range use, deferred grazing, and a planned grazing system.

This soil is a poor source of reconstruction material for drastically disturbed areas because of a high content of clay.

The capability classification is 3s, irrigated, and 4e, nonirrigated. This unit is in the Semidesert Clay Loam ecological site #328.

33—Emmons-Cerro-Pagoda complex, 5 to 30 percent slopes, very stony

This map unit is on structural benches. About 1 percent of the surface is covered with basalt stones. The stones are spaced about 5 to 25 feet apart. Individual areas of this unit are irregularly shaped and range from 100 to 2,000 acres in size. The native vegetation is mainly shrubs and grasses. Elevation is 6,800 to 8,000 feet. The average annual precipitation is 15 to 17 inches, the average annual air temperature is 40 to 45 degrees F, and the average frost-free period is 80 to 100 days.

This unit is about 30 percent Emmons soil, 25 percent Cerro soil, and 25 percent Pagoda soil. The three soils occur as areas so intricately intermingled that mapping them separately was not practical at the scale used.

Included in mapping are small areas of Empedrado loam, Fughes clay loam, Hesperus loam, Godding stony loam, Golime cobbly loam, and Peninsula loam. Included areas make up about 20 percent of the total acreage of this unit. The percentage varies from one mapped area to another.

The Emmons soil is deep and well drained. It formed in colluvium and residuum derived dominantly from the Wasatch Formation and mixed sources. Typically, the surface layer is brown loam about 8 inches thick. The upper part of the subsoil is brown and pale brown silt loam about 11 inches thick. The lower part of the subsoil to a depth of 60 inches or more is very pale brown and light gray silt loam.

Permeability is moderate in the Emmons soil. The available water capacity is high. The effective rooting depth is 60 inches or more. Runoff is rapid or very rapid, and the hazard of water erosion is severe.

The Cerro soil is deep and well drained. It formed in colluvium and residuum derived dominantly from marine shales of the Wasatch Formation. Typically, the surface layer is grayish brown and brown silty clay loam about 7 inches thick. The upper part of the subsoil is brown and light yellowish brown silty clay loam and silty clay about 28 inches thick. The lower part of the subsoil is very pale brown silty clay loam about 9 inches thick. The substratum to a depth of 60 inches or more is light yellowish brown, very pale brown, pink, and white silty clay loam.

Permeability is slow in the Cerro soil. The available water capacity is high. The effective rooting depth is 60 inches or more. Runoff is medium or rapid, and the hazard of water erosion is moderate or severe.

The Pagoda soil is deep and well drained. It formed in colluvium derived dominantly from shale. Typically, the surface layer is dark grayish brown clay loam about 6 inches thick. The upper part of the subsoil is very dark grayish brown and brown clay loam about 11 inches thick. The next 23 inches is brown clay. The lower part of the subsoil to a depth of 60 inches or more is brown clay loam.

Permeability is slow in the Pagoda soil. The available water capacity is moderate. The effective rooting depth is 60 inches or more. Runoff is medium or rapid, and the hazard of water erosion is severe or very severe.

This unit is used for livestock grazing or as wildlife habitat.

The potential plant community on the Emmons soil is mainly bottlebrush squirreltail, western wheatgrass, streambank wheatgrass, and mountain big sagebrush. If range condition declines as a result of overgrazing, mountain big sagebrush, Saskatoon serviceberry, low rabbitbrush, and forbs increase. If continued deterioration is allowed, tall rabbitbrush, cheatgrass, other introduced plants, and annuals invade. The average annual production of air-dry vegetation is about 300 pounds per acre.

The potential plant community on the Cerro soil is mainly western wheatgrass, slender wheatgrass, Letterman's needlegrass, mountain big sagebrush, mule-ears, and muttongrass. If this plant community is overgrazed, mountain big sagebrush, Saskatoon serviceberry, and mule-ears increase. If continued deterioration is allowed, tall rabbitbrush, houndstongue, stickseed, and Kentucky bluegrass invade. The average annual production of air-dry vegetation is about 2,000 pounds per acre.

The potential plant community on the Pagoda soil is mainly mountain brome, nodding brome, Columbia needlegrass, elk sedge, Gambel's oak, Saskatoon serviceberry, and mountain snowberry. If range condition declines as a result of overgrazing, Gambel's oak, Saskatoon serviceberry, and mountain snowberry increase. If continued deterioration is allowed, Kentucky bluegrass, tall rabbitbrush, Canada thistle, and downy brome invade. The average annual production of air-dry vegetation is about 2,000 pounds per acre. Stones on the surface prevent mechanical operations, such as drilling grass seed and mechanical brush management. Suitable management practices in areas of this unit include proper grazing use, deferred grazing, and a planned grazing system.

The Emmons and Cerro soils are only a fair source of reconstruction material for drastically disturbed areas because of the large stones on the surface. Excess clay is an additional limitation in areas of the Cerro soil. The Pagoda soil is a fair or poor source of reconstruction material because of excess clay and the large stones on the surface.

The capability classification of this map unit is 6e, nonirrigated. The Emmons soil is in the Dry Mountain Shale ecological site #242, the Cerro soil is in the Deep Clay Loam ecological site #247, and the Pagoda soil is in the Brushy Loam ecological site #238.

34—Empedrado loam, 25 to 45 percent slopes

This deep, well drained soil is on side slopes and footslopes. It formed in colluvium derived dominantly from mixed sedimentary rocks. The native vegetation is mainly shrubs and grasses. Elevation is 7,400 to 7,900 feet. The average annual precipitation is 16 to 20 inches, the average annual air temperature is 42 to 44 degrees F, and the average frost-free period is 85 to 100 days.

Typically, the surface layer is dark grayish brown loam about 10 inches thick. The upper part of the subsoil is yellowish brown clay loam about 11 inches thick. The next part is light olive brown gravelly sandy clay loam about 7 inches thick. The lower part of the subsoil to a depth of 60 inches or more is yellowish brown and pale brown loam.

Included in mapping are small areas of soils that do not have developed subsoil layers. Also included are small areas of Hesperus loam, Pagoda clay loam, Cathedral very stony loam, and Veatch loam. The extent of these included areas varies from one delineation to another.

Permeability is moderate in the Empedrado soil. The available water capacity also is moderate. The effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is very severe.

This unit is used for livestock grazing or as wildlife habitat.

The potential plant community is mainly Gambel's oak, Saskatoon serviceberry, mountain brome, big bluegrass, elk sedge, and mountain snowberry. If range condition declines as a result of overgrazing, shrubs, forbs, and Kentucky bluegrass increase or invade. The potential production of the native understory vegetation in normal years is about 2,000 pounds of air-dry vegetation per acre. Suitable management practices include proper grazing use, deferred grazing, and a planned grazing system.

This unit is only a fair source of reconstruction material for drastically disturbed areas because of a high content of clay in the subsoil.

The capability classification is 7e, nonirrigated. This unit is in the Brushy Loam ecological site #238.

35—Empedrado-Pagoda-Godding complex, 6 to 25 percent slopes, stony

This map unit is on benches, mudflows, and till plains. Individual areas are irregularly shaped and range from 1,000 to 2,000 acres in size. The native vegetation is mainly large shrubs and grasses. Elevation is 7,200 to 9,000 feet. The average annual precipitation is 16 to 20 inches, the average annual air temperature is 41 to 44 degrees F, and the average frost-free period is 85 to 90 days.

This unit is about 35 percent Empedrado soil, 30 percent Pagoda soil, and 25 percent Godding soil. The three soils occur as areas so intricately intermingled that mapping them separately was not practical at the scale used.

Included in mapping are small areas of Hesperus loam and Wesdy stony loam. Also included are small areas of wet soils. Included areas make up about 10 percent of the total acreage of this unit. The percentage varies from one mapped area to another.

The Empedrado soil is deep and well drained. It formed in residuum and colluvium derived dominantly from interbedded sandstone and shale. Typically, the surface layer is dark grayish brown loam about 10 inches thick. The upper part of the subsoil is yellowish brown clay loam about 11 inches thick. The next part is light olive brown gravelly sandy clay loam about 7 inches thick. The lower part of the subsoil to a depth of 60 inches or more is yellowish brown and pale brown loam.

Permeability is moderate in the Empedrado soil. The available water capacity also is moderate. The effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate or severe. The surface has stones and boulders spaced about 25 to 50 feet apart.

The Pagoda soil is deep and well drained. It formed in colluvium derived dominantly from shale. Typically, the surface layer is dark grayish brown and very dark grayish brown clay loam about 10 inches thick. The upper part of the subsoil is dark brown clay loam about 7 inches thick. The next part is brown clay about 23 inches thick. The lower part of the subsoil to a depth of 60 inches or more is brown clay loam.

Permeability is slow in the Pagoda soil. The available water capacity is moderate. The effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is severe. The surface has stones and boulders spaced about 25 to 50 feet apart.

The Godding soil is deep and well drained. It formed on till plains derived dominantly from basalt. Typically, the surface layer is dark grayish brown stony loam about 7 inches thick. The upper part of the subsoil is dark grayish brown and brown very stony clay about 20 inches thick. The lower part to a depth of 60 inches or more is light yellowish brown and brown very stony clay loam.

Permeability is slow in the Godding soil. The available water capacity is moderate. The effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate. The surface has stones and boulders spaced about 25 to 50 feet apart.

This unit is used mainly for livestock grazing or as wildlife habitat. It is also used as watershed.

The potential plant community is mainly Gambel's oak, mountain brome, nodding brome, big bluegrass, elk sedge, and Saskatoon serviceberry. If the condition of the understory declines as a result of excessive grazing, Gambel's oak and Saskatoon serviceberry increase. If continued deterioration is allowed, Kentucky bluegrass, tall rabbitbrush, Canada thistle, and downy brome invade. The average annual production of air-dry vegetation is about 2,000 pounds per acre. If the range is overgrazed, the proportion of preferred forage plants decreases and the proportion of less preferred forage plants increases. Therefore, livestock grazing should be managed so that the desired balance of preferred species is maintained in the plant community. Range seeding is suitable if the range is in poor condition.

This unit is poorly suited to homesite development. The main limitations are the slope and large stones.

The Empedrado soil is only a fair source of reconstruction material for drastically disturbed areas because of a high content of clay. The Pagoda soil is a poor source of this material because of a high content of clay. The Godding is a poor source because of the large stones and a high content of clay.

The capability classification is 6e, nonirrigated. This unit is in the Brushy Loam ecological site #238.

36—Fluvaquents, 0 to 3 percent slopes

This map unit consists of deep, poorly drained, nearly level soils on flood plains and first terraces. These soils formed in alluvium.

Fluvaquents are stratified and vary widely in texture and depth to sand, gravel, and cobbles. A common profile of Fluvaquents has a surface layer of loam

about 2 inches thick. The underlying layers are stratified sandy loam, loamy sand, silty clay loam, gravelly loam, and very gravelly loamy sand. In some areas gravel and cobbles are on or near the surface.

The water table fluctuates between the surface and a depth of 12 inches during periods of spring runoff from snowmelt. These soils are subject to occasional brief periods of flooding late in the spring and in the early summer.

Included in mapping are small areas of Panitchen loam, Cameo fine sandy loam, Aga very fine sandy loam, and small isolated areas where water stands at or near the surface all year. Also included are somewhat poorly drained areas on the first terrace that are subject to rare flooding.

This map unit is used as wildlife habitat, for recreational purposes, or for livestock grazing.

Plant species in areas of this unit include cottonwood, willow, and water-tolerant grasses, sedges, and rushes.

Mule deer, cottontail rabbit, coyote, bobcat, ducks, geese, bald eagles, and other native birds use areas of this unit for food and shelter. Where feasible, planting small grain, trees, and shrubs enhances the habitat for upland wildlife.

This unit is poorly suited to homesite development. The main limitations are the flooding and the seasonal high water table.

The capability classification is 6w, nonirrigated. This unit is in the Riverbottom ecological site.

37—Fughes clay loam, 2 to 6 percent slopes

This deep, well drained soil is on mesas and terraces. It formed in alluvium and colluvium derived dominantly from mixed sedimentary rock. The present vegetation is mainly hay and small grain. Elevation is 6,800 to 7,400 feet. The average annual precipitation is 15 to 20 inches, the average annual air temperature is 40 to 45 degrees F, and the average frost-free period is 85 to 105 days.

Typically, the surface layer is dark grayish brown clay loam about 7 inches thick. The upper part of the subsoil is dark grayish brown clay loam about 11 inches thick. The lower part is dark brown silty clay loam about 32 inches thick. The substratum to a depth of 62 inches or more is brown silty clay loam.

Included in mapping are small areas of Pagoda clay loam. Also included are small areas of soils that are similar to the Fughes soil but have less clay, soils that have a thinner surface layer than that of the Fughes soil, and areas in which the surface is stony.

Permeability is slow in the Fughes soil. The available water capacity is high. The effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is slight.

This unit is used for irrigated hayland, pasture, small grain production, or livestock grazing.

If this unit is used for hay and pasture, the main limitations are the uneven terrain and the slope. Seedbed preparation should be on the contour or across the slope where practical. Proper grazing practices, weed control, and fertilizer are needed to ensure maximum quality of forage. Irrigation water can be applied by the sprinkler method or the contour ditch method (fig. 8).

The potential native plant community is mainly Gambel's oak, elk sedge, western wheatgrass, Saskatoon serviceberry, and mountain snowberry. The average annual production of air-dry vegetation is about 2,000 pounds per acre. If the range is overgrazed, the proportion of preferred forage plants decreases and the proportion of less preferred forage plants increases. Therefore, livestock grazing should be managed so that the desired balance of preferred species is maintained in the plant community.

Range seeding is suitable if the range is in poor condition. Adapted native grasses are nodding brome, western wheatgrass, Columbia needlegrass, and big bluegrass. Introduced grasses that may be considered in a seed mixture are intermediate wheatgrass, smooth brome, and orchardgrass. Brush management can improve deteriorated areas of range that are producing more woody shrubs than were present in the potential plant community. Suitable management practices include proper grazing use, deferred grazing, and a planned grazing system.

This soil is only a fair source of reconstruction material for drastically disturbed areas because of a high content of clay.

The capability classification is 3e, irrigated, and 4e, nonirrigated. This unit is in the Brushy Loam ecological site #238.

38—Fughes clay loam, 3 to 9 percent slopes, stony

This deep, well drained soil is on the upper fringes of valley terraces. It formed in alluvium and colluvium derived dominantly from mixed rock sources. The native vegetation is mainly shrubs and grasses. Elevation is 7,000 to 7,800 feet. The average annual precipitation is 16 to 20 inches, the average annual air temperature is 40 to 45 degrees F, and the average frost-free period is 80 to 105 days.

Typically, the surface is covered with stones that are spaced 25 to 75 feet apart. The surface layer is

Figure 8.—A gravity pressure sprinkler system used for irrigation in an area of Fughes clay loam, 2 to 6 percent slopes.

dark grayish brown clay loam about 7 inches thick. The upper part of the subsoil is dark grayish brown clay loam about 11 inches thick. The lower part is dark brown silty clay loam about 32 inches thick. The substratum to a depth of 62 inches or more is brown silty clay loam.

Included in mapping are small areas of Pagoda clay loam and Empedrado loam.

Permeability is slow in the Fughes soil. The available water capacity is high. The effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is slight or moderate.

This unit is used mainly for livestock grazing. It is also used for pasture or as wildlife habitat.

The potential plant community is mainly western wheatgrass, elk sedge, Saskatoon serviceberry, mountain snowberry, and Gambel's oak. If range condition declines as a result of excessive grazing, shrubs increase. If continued deterioration is allowed, tall rabbitbrush, Kentucky bluegrass, Canada thistle, and downy brome invade. The average annual production of air-dry vegetation is about 2,000 pounds per acre. The suitability of this soil for range seeding is poor because of the stones on the surface and in the upper part of the profile. Suitable management practices include proper range use, deferred grazing, and a planned grazing system.

If this unit is used for hay and pasture, the main limitations are the stones (fig. 9). Use of irrigation water and applications of nitrogen and phosphorus fertilizer promote good growth of forage plants.

The capability classification is 4e, nonirrigated. This unit is in the Brushy Loam ecological site #238.

Figure 9.—Rock fences have been made with rocks removed from the surface of an area of Fughes clay loam, 3 to 9 percent slopes, stony.

39—Fughes-Hesperus complex, 3 to 12 percent slopes

This map unit is on terraces and toeslopes. The vegetation in areas that are not cultivated is mainly shrubs, grasses, and forbs. Elevation is 7,400 to 7,800 feet. The average annual precipitation is 20 to 22 inches, the average annual air temperature is about 41 degrees F, and the average frost-free period is 75 to 85 days.

This unit is about 60 percent Fughes soil and 25 percent Hesperus soil. The two soils occur as areas so intricately intermingled that mapping them separately was not practical at the scale used. The Fughes soil is on stream terraces and valley terraces. The Hesperus soil is in areas of the more recently deposited alluvium, either on toeslopes of alluvial fans or in narrow drainageways.

Included in mapping are small areas of Pagoda clay loam. Included areas make up about 15 percent of the total acreage of this unit. The percentage varies from one mapped area to another.

The Fughes soil is deep and well drained. It formed in alluvium and localized mudflows derived dominantly from shale rocks. Typically, the surface layer is dark grayish brown clay loam about 7 inches thick. The upper part of the subsoil is dark grayish brown clay loam about 11 inches thick. The lower part is dark brown silty clay loam about 32 inches thick. The substratum to a depth of 62 inches or more is brown silty clay loam. In some areas the surface layer is loam.

Permeability is slow in the Fughes soil. The available water capacity is high. The effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is slight to severe.

The Hesperus soil is deep and well drained. It formed in alluvium and localized colluvium derived dominantly from shales. Typically, the surface layer is very dark gray and dark grayish brown loam about 7 inches thick. The upper part of the subsoil is brown clay loam about 17 inches thick. The lower part is dark yellowish brown clay loam about 13 inches thick. The substratum to a depth of 60 inches or more is brown clay loam.

Permeability is moderately slow in the Hesperus soil. The available water capacity is high. The effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion ranges from slight on the lower slopes to very severe in the steeper areas.

This unit is used mainly for irrigated pasture, grain, and grain hay. It is also used for livestock grazing.

If this unit is used for hay and pasture, the main limitations are the uneven terrain and the slope. Seedbed preparation should be on the contour or across the slope where practical. Proper grazing practices, weed control, and fertilizer are needed to ensure maximum quality of forage.

If this unit is used for small grain crops, the main limitations are the uneven terrain and the slope. Sprinkler irrigation can be used, but the water should be applied slowly so that the runoff rate is minimized. Also, applying the water at a slow rate over a long period helps to ensure that the root zone is properly wetted. Maintaining a cover of crop residue on or near the surface reduces the runoff rate, helps to control soil blowing, and helps to maintain soil tilth and the content of organic matter. The hazard of erosion can be reduced if fall grain is seeded early, stubble-mulch tillage is used, and tillage and seeding are on the contour or across the slope. Also, waterways should be shaped and seeded to perennial grass.

The potential plant community is mainly nodding brome, elk sedge, Gambel's oak, Saskatoon serviceberry, and mountain snowberry. The average annual production of air-dry vegetation is about 2,000 pounds per acre. If the range is overgrazed, the proportion of preferred forage plants decreases and the proportion of less preferred forage plants increases. Therefore, livestock grazing should be managed so that the desired balance of preferred species is maintained in the plant community. Suitable management practices include proper range use, deferred grazing, and a planned grazing system.

The Fughes soil is only a fair source of reconstruction material for drastically disturbed areas because of a high content of clay in the subsoil. The Hesperus soil is a good source of this material.

The capability classification of this map unit is 4e, irrigated and nonirrigated. The unit is in the Brushy Loam ecological site #238.

40—Godding stony loam, 9 to 25 percent slopes, extremely bouldery

This deep, well drained soil is on glacial till plains. It formed in outwash material derived dominantly from basalt, sandstone, and shale. Slopes are predominantly convex. Individual areas of this unit are irregularly shaped and range from 500 to 2,000 acres in size. The native vegetation is mainly large shrubs and mixed grasses. Elevation is 7,000 to 8,300 feet. The average annual precipitation is 18 to 25 inches, the average annual air temperature is 41 to 44 degrees F, and the average frost-free period is 70 to 90 days.

Typically, about 5 to 10 percent of the surface is covered with stones and boulders. The surface layer is dark grayish brown stony loam about 7 inches thick. The upper part of the subsoil is dark grayish brown very stony clay loam and very stony clay about 10 inches thick. The lower part to a depth of 60 inches or more is brown and light yellowish brown very stony clay and very stony clay loam.

Included in mapping are small areas of Golime cobbly loam and Peninsula loam. Included areas make up about 25 percent of the total acreage of this unit.

Permeability is slow in the Godding soil. The available water capacity is moderate. The effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is moderate.

This unit is used mainly for livestock grazing. It is also used as wildlife habitat.

The potential plant community is mainly nodding brome, elk sedge, big bluegrass, Gambel's oak, Saskatoon serviceberry, and mountain snowberry. If range condition deteriorates as a result of overgrazing, Gambel's oak, Saskatoon serviceberry, and mountain snowberry increase. If continued deterioration is allowed, tall rabbitbrush, Kentucky bluegrass, Canada thistle, and downy brome invade. The average annual production of air-dry vegetation is about 2,000 pounds per acre. The suitability of this soil for range seeding is poor because of the stones on the surface and in the surface layer. Suitable management practices include proper range use, deferred grazing, and a planned grazing system.

This unit is poorly suited to homesite development.

The main limitations are the large stones and boulders. The slope is also a limitation in areas where it is more than about 15 percent.

This soil is a poor source of reconstruction material for drastically disturbed areas because of the large stones and a high content of clay in the subsoil.

The capability classification is 6e, nonirrigated. This unit is in the Brushy Loam ecological site #238.

41—Golime cobbly loam, 5 to 15 percent slopes, very bouldery

This deep, well drained soil is on till plains. It formed in outwash material derived dominantly from basalt, sandstone, and shale. Slopes are predominantly convex. The native vegetation is mainly large shrubs and mixed grasses. Elevation is 6,200 to 7,000 feet. The average annual precipitation is 15 to 18 inches, the average annual air temperature is 44 to 45 degrees F, and the average frost-free period is 90 to 95 days.

About 1 to 3 percent of the surface is covered with stones and boulders that are spaced 10 to 50 feet apart. Typically, the surface layer is grayish brown cobbly loam about 10 inches thick. The upper part of the subsoil is brown and yellowish brown very cobbly clay loam and very stony clay loam about 24 inches thick. The next part is pale brown extremely cobbly sandy clay loam about 11 inches thick. The lower part of the subsoil to a depth of 60 inches or more is light brownish gray extremely stony sandy loam.

Included in mapping are small areas of Godding stony loam and Peninsula loam. Included areas make up about 20 percent of the total acreage of this unit.

Permeability is slow in the Golime soil. The available water capacity is low. The effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is slight.

This unit is used for livestock grazing or as wildlife habitat.

The potential climax plant community consists of prairie Junegrass, muttongrass, needleandthread, western wheatgrass, and mountain big sagebrush. If range condition declines as a result of overgrazing, forbs, mountain big sagebrush, and mountain snowberry increase. The average annual production of air-dry vegetation is about 1,500 pounds per acre. Brush management can improve deteriorated areas of range that are producing more woody shrubs than were present in the potential plant community. Boulders on the surface prevent mechanical treatment. Also, the suitability of this unit for range seeding is poor because of the boulders. Suitable management practices include proper range use, deferred grazing, and a planned grazing system.

This unit is moderately well suited to homesite development. The main limitations are the large stones and a moderate shrink-swell potential. The effects of shrinking and swelling can be minimized by using proper engineering designs and by backfilling with material that has a low shrink-swell potential.

This soil is a poor source of reconstruction material for drastically disturbed areas mainly because of the high content of large stones.

The capability classification is 6e, nonirrigated. This unit is in the Deep Loam ecological site #292.

42—Grobutte very channery loam, 30 to 60 percent slopes

This deep, well drained soil is on steep hills and mountainsides. It formed in colluvium derived dominantly from mixed material. The native vegetation is mainly shrubs and grass. Elevation is 6,000 to 8,000 feet. The average annual precipitation is 16 to 18 inches, the average annual air temperature is 36 to 38 degrees F, and the average frost-free period is 80 to 100 days.

Typically, the surface layer is grayish brown very channery loam about 4 inches thick. The underlying material to a depth of 60 inches or more is light gray very channery loam.

Included in mapping are small areas of Tosca channery loam and Wrayha gravelly sandy loam. Included areas make up about 10 percent of the total acreage of this unit.

Permeability is moderately rapid in the Grobutte soil. The available water capacity is low. The effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is very severe.

This unit is used mainly for livestock grazing, wildlife habitat, or wood production.

The potential plant community is an overstory of twoneedle pinyon, wheatgrass, true mountain mahogany, mountain big sagebrush, and Gambel's oak and an understory of bluebunch wheatgrass, western wheatgrass, and muttongrass. If range condition declines as a result of overgrazing, Gambel's oak, twoneedle pinyon, and forbs increase. If continued deterioration is allowed, Canada thistle, cheatgrass, and rabbitbrush invade. The average annual understory production of air-dry vegetation is about 550 pounds per acre. The main limitations affecting seeding are the slopes and restricted

accessibility. Suitable management practices include proper grazing use, deferred grazing, and a planned grazing system.

This unit is suited to wood production. The site index for twoneedle pinyon ranges from 35 to 45. Based on a site index of 40 for twoneedle pinyon, this soil can produce less than 3.3 cubic feet of wood per acre per year. The main concerns affecting the production and harvesting of wood products are the slope, droughtiness, and excessive runoff.

This soil is a poor source of reconstruction material for drastically disturbed areas because of excess lime throughout the profile.

The capability classification is 7e, nonirrigated. This unit is in the Mountain Pinyon ecological site #448.

43—Haploborolls-Rock outcrop complex, 50 to 80 percent slopes

This map unit is on mainly south-facing mountain side slopes. The native vegetation is mainly scattered Rocky Mountain Douglas-fir, twoneedle pinyon, juniper, true mountain mahogany, Indian ricegrass, and wheatgrass. Elevation is 7,700 to 8,200 feet. The average annual precipitation is 16 to 20 inches, the average annual air temperature is 40 to 45 degrees F, and the average frost-free period is 65 to 100 days.

This unit is about 60 percent Haploborolls and 30 percent Rock outcrop. The two components occur as areas so intricately intermingled that mapping them separately was not practical at the scale used.

Included in mapping are shallow and moderately deep soils that do not have a dark surface layer. These soils make up about 10 percent of the total acreage of this unit.

Haploborolls are shallow to deep and are well drained. They formed in colluvium and residuum derived dominantly from calcareous sandstone. No single profile is typical of the Haploborolls, but a common profile in the survey area has a surface layer that is about 6 inches of dark grayish brown loam over 5 inches of dark grayish brown gravelly sandy clay loam. The upper part of the subsoil is brown very stony loam about 11 inches thick. The lower part is very pale brown very cobbly sandy clay loam about 10 inches thick. Sandstone bedrock is at a depth of about 32 inches.

Permeability is moderate in the Haploborolls. The available water capacity is low. The effective rooting depth is 10 to 60 inches. Runoff is rapid, and the hazard of water erosion is very severe.

Rock outcrop consists of barren escarpments and rocky points of sandstone, shaly limestone, or siltstone.

This unit is used as wildlife habitat.

Plant species in areas of this unit include true mountain mahogany, mountain big sagebrush, Indian ricegrass, and western wheatgrass and scattered twoneedle pinyon and Utah juniper. The average annual production of air-dry vegetation ranges from 400 to 800 pounds per acre.

Because of the slope, efficient grazing is not practical in areas of this unit.

Haploborolls are a poor source of reconstruction material for drastically disturbed areas because of large stones.

The capability classification of the Haploborolls is 8e, nonirrigated. The ecological site for the Haploborolls is similar to Brushy Loam #238.

44—Happle very channery sandy loam, 3 to 12 percent slopes

This deep, well drained soil is on alluvial fans. It formed in alluvium derived dominantly from the Green River shale formation. The native vegetation is mainly sagebrush, grasses, and forbs. Elevation is 5,200 to 6,000 feet. The average annual precipitation is 12 to 15 inches, the average annual air temperature is 46 to 52 degrees F, and the average frost-free period is 100 to 150 days.

Typically, the surface layer is light gray very channery sandy loam about 7 inches thick. The upper part of the underlying material is very pale brown very channery sandy loam about 7 inches thick. The next part is light gray very channery sandy clay loam about 18 inches thick. The lower part of the underlying material to a depth of 60 inches or more is light gray extremely channery coarse sandy loam.

Included in mapping are small areas of Debeque very channery loam. Also included are small areas of Cumulic Haploborolls. Included areas make up about 20 percent of the total acreage of this unit. The percentage varies from one mapped area to another.

Permeability is moderate in the Happle soil. The available water capacity is low. The effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is severe.

This unit is used for livestock grazing. It can be used for irrigated hay and pasture if irrigation water is available.

The potential plant community is mainly western wheatgrass, needleandthread, bottlebrush squirreltail, Sandberg bluegrass, and Wyoming big sagebrush. Other plants that occur in smaller quantities are many forbs and small low rabbitbrush. If range condition declines as a result of overgrazing, forbs, low rabbitbrush, and Wyoming big sagebrush increase. If continued deterioration is allowed, Utah juniper and

cheatgrass invade. The average annual production of air-dry vegetation is about 800 pounds per acre.

Seeding late in fall helps to ensure establishment of seedlings the following spring when the content of moisture in the soil is more likely to be adequate. Native grasses that can be seeded in areas of this unit are western wheatgrass, needleandthread, bluebunch wheatgrass, and Indian ricegrass. Introduced grasses that may be considered for pasture planting are crested wheatgrass and Russian wildrye. The plants selected for seeding should meet the seasonal requirements of livestock, wildlife, or both. Brush management can improve deteriorated areas of range that are producing more woody shrubs than were present in the potential plant community. Suitable management practices include proper range use, deferred grazing, and a planned grazing system.

Grasses and legumes grow well if adequate fertilizer is used. Leveling helps to ensure the uniform application of water. Proper grazing practices, weed control, and fertilizer are needed to ensure maximum quality of forage. Because of the moderately rapid permeability in this soil, adjusting the length of runs is necessary to permit adequate infiltration of water.

This soil is only a fair source of reconstruction material for drastically disturbed areas because of the limited available water capacity.

The capability classification is 4e, nonirrigated. This unit is in the Rolling Loam ecological site #298.

45—Happle very channery sandy loam, 12 to 25 percent slopes

This deep, well drained soil is on alluvial-colluvial fans and toeslopes. It formed in colluvium and alluvium derived dominantly from the Green River shale formation. The native vegetation is mainly sagebrush, grasses, and forbs. Elevation is 5,400 to 6,200 feet. The average annual precipitation is 12 to 15 inches, the average annual air temperature is 46 to 52 degrees F, and the average frost-free period is 100 to 150 days.

Typically, the surface layer is light gray very channery sandy loam about 7 inches thick. The upper part of the underlying material is very pale brown very channery sandy loam about 7 inches thick. The next part is light gray very channery sandy clay loam about 18 inches thick. The lower part of the underlying material to a depth of 60 inches or more is light gray extremely channery coarse sandy loam.

Included in mapping are small areas of Debeque very channery loam. Included areas make up about 20 percent of the total acreage of this unit. The percentage varies from one mapped area to another.

Permeability is moderate in the Happle soil. The available water capacity is low. The effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is severe.

This unit is used for livestock grazing or as wildlife habitat.

The potential plant community is mainly bluebunch wheatgrass, needleandthread, western wheatgrass, Indian ricegrass, true mountain mahogany, and Wyoming big sagebrush. Other less extensive grasses are muttongrass and a variety of forbs. If range condition declines as a result of overgrazing, all the grasses will decrease and forbs and shrubs will increase. If continued deterioration is allowed, Russian thistle and cheatgrass invade. The average annual production of air-dry vegetation is about 750 pounds per acre.

Range seeding generally is limited to broadcasting because of the slope and the stones on the surface. Seeding late in fall helps to ensure establishment of seedlings the following spring when the content of moisture in the soil is more likely to be adequate. Adapted native grasses are bluebunch wheatgrass, Indian ricegrass, and western wheatgrass. Introduced grasses that may be considered for pasture planting include crested wheatgrass and pubescent wheatgrass. Selection of species should be based on the needs of livestock and wildlife. The use of mechanical equipment for brush control is not practical because of the slope and the stones on the surface. Suitable management practices include proper range use, deferred grazing, and a planned grazing system.

This soil is only a fair source of reconstruction material for drastically disturbed areas because of the limited available water capacity.

The capability classification is 6e, nonirrigated. This unit is in the Loamy Slopes ecological site #303.

46—Happle-Rock outcrop association, 25 to 65 percent slopes

This map unit is on side slopes and canyon rims. The native vegetation is mainly sagebrush, grass, and forbs. Elevation is 6,200 to 7,200 feet. The average annual precipitation is 12 to 15 inches, the average annual air temperature is 46 to 52 degrees F, and the average frost-free period is 100 to 150 days.

This unit is about 50 percent Happle very channery sandy loam and 35 percent Rock outcrop. The Happle soil is on the lower part of the slopes, and the Rock outcrop is on the upper part (fig. 10).

Included in mapping are small areas of soils that are similar to the Happle soil but are shallow or

Figure 10.—An area of Happle-Rock outcrop association, 25 to 65 percent slopes. The Happle soil formed in colluvium. The Rock outcrop consists of Green River shale.

moderately deep. Also included are small areas of Debeque very channery loam.

The Happle soil is deep and well drained. It formed in colluvium derived dominantly from the Green River shale formation. Typically, the surface layer is light gray very channery sandy loam about 7 inches thick. The upper part of the substratum is very pale brown very channery sandy loam about 7 inches thick. The next part is light gray very channery sandy clay loam about 18 inches thick. The lower part of the substratum to a depth of 60 inches or more is light gray extremely channery coarse sandy loam.

Permeability is moderate in the Happle soil. The available water capacity is low. The effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is severe.

Rock outcrop occurs as horizontal bands 20 to 80 feet high along canyon rims and as buttresses extending into areas of the Happle soil. The buttresses make up about 10 percent of the Rock outcrop.

This unit is used for livestock grazing or as wildlife habitat.

The potential plant community on the Happle soil is mainly Indian ricegrass, western wheatgrass, bottlebrush squirreltail, shadscale saltbush, and Wyoming big sagebrush. If range condition declines as a result of overgrazing, the proportion of palatable grasses decreases and Wyoming big sagebrush and forbs increase. The average annual production of air-dry vegetation is about 850 pounds per acre.

Seeding is not practical in areas of this unit because of the stoniness and the slope. The use of mechanical equipment for brush control is not practical because of the slope and the stones on the surface.

The Happle soil is a poor source of reconstruction material for drastically disturbed areas because of the restricted available water capacity.

The capability classification of the Happle soil is 7e, nonirrigated. The Happle soil is in the Steep Colluvial Slopes ecological site #445. No ecological site is assigned for the Rock outcrop.

47—Hesperus-Empedrado, moist-Pagoda complex, 5 to 35 percent slopes

This map unit is on mountainsides and benches. The native vegetation is mainly shrubs, forbs, and grasses. Elevation is 6,200 to 8,500 feet. The average annual precipitation is 18 to 20 inches, the average annual air temperature is 42 to 44 degrees F, and the average frost-free period is 85 to 100 days.

This unit is about 35 percent Hesperus loam, 30 percent Empedrado loam, and 20 percent Pagoda clay loam. The three soils occur as areas so intricately intermingled that mapping them separately was not practical at the scale used. The Hesperus soil is on the steeper mountainsides, the Empedrado soil is on the benches and in the less sloping areas, and the Pagoda soil is on the benches and mountaintops.

Included in mapping are areas of Veatch loam and Cathedral loam. The Veatch soil makes up about 8 percent of the total acreage of this unit, and the Cathedral soil makes up about 7 percent.

The Hesperus soil is deep and well drained. It formed in residuum derived dominantly from sandstone and shale. Typically, the surface layer is very dark gray and dark grayish brown loam about 7 inches thick. The subsoil is brown clay loam about 17 inches thick. The upper part of the substratum is dark yellowish brown clay loam about 13 inches thick. The lower part to a depth of 60 inches or more is brown clay loam.

Permeability is moderately slow in the Hesperus soil. The available water capacity is high. The effective rooting depth is 60 inches or more. Runoff is medium or rapid, and the hazard of water erosion is moderate to very severe.

The Empedrado soil is deep and well drained. It formed in residuum and colluvium derived dominantly from interbedded sandstone and shale. Typically, the surface layer is dark grayish brown loam about 10 inches thick. The upper part of the subsoil is yellowish brown clay loam about 11 inches thick. The next part is light olive brown gravelly sandy clay loam about 7 inches thick. The lower part of the subsoil to a depth of 60 inches or more is yellowish brown and pale brown loam.

Permeability is moderate in the Empedrado soil. The available water capacity also is moderate. The effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is very severe.

The Pagoda soil is deep and well drained. It formed in colluvium derived dominantly from shale. Typically, the surface layer is dark grayish brown clay loam about 6 inches thick. The upper part of the subsoil is dark brown clay loam about 11 inches thick. The next part is brown clay about 23 inches thick. The lower part of the subsoil to a depth of 60 inches or more is brown clay loam.

Permeability is slow in the Pagoda soil. The available water capacity is moderate. The effective rooting depth is 60 inches or more. Runoff is medium or rapid, and the hazard of water erosion is severe or very severe.

This unit is used for livestock grazing or as winter habitat for mule deer.

The potential plant community is mainly mountain brome, nodding brome, elk sedge, Saskatoon serviceberry, big bluegrass, and Gambel's oak. If range condition declines as a result of overgrazing, Gambel's oak, Saskatoon serviceberry, and forbs increase. If continued deterioration is allowed, Canada thistle, cheatgrass, and rabbitbrush invade. The average annual production of air-dry vegetation is about 2,000 pounds per acre.

Range seeding is a suitable practice if the range is in poor condition. The main limitations affecting seeding are the slope and restricted accessibility. Suitable native grass seeding mixtures include mountain brome, nodding brome, western wheatgrass, intermediate wheatgrass, and slender wheatgrass. For pasture plantings, introduced grasses, such as smooth brome, orchardgrass, and intermediate wheatgrass, are suitable. Selection of species should be based on the needs of livestock and wildlife.

The Hesperus and Empedrado soils are a good source of reconstruction material for drastically disturbed areas. The upper 1½ feet of the Pagoda soil is a good source of this material. Below this depth, however, the Pagoda soil is a poor source because of the high content of clay.

The capability classification of this unit is 6e, nonirrigated. The unit is in the Brushy Loam ecological site #238.

48—Hesperus-Empedrado, moist-Pagoda complex, 35 to 55 percent slopes

This map unit is on mountains and terraces or benches (fig. 11). The native vegetation is mainly shrubs, forbs, and grasses. Elevation is 6,200 to 8,500 feet. The average annual precipitation is 18 to 20 inches, the average annual air temperature is 42 to 44 degrees F, and the average frost-free period is 85 to 100 days.

This unit is about 35 percent Hesperus loam, 30 percent Empedrado loam, and 20 percent Pagoda clay loam. The three soils occur as areas so intricately intermingled that mapping them separately was not practical at the scale used. The Hesperus soil is on

Figure 11.—An area of Hesperus-Empedrado, moist-Pagoda complex, 35 to 55 percent slopes. This map unit is susceptible to massive slumps.

the steeper mountainsides, the Empedrado soil is on the benches and in the less sloping areas, and the Pagoda soil is on the benches and mountaintops.

Included in mapping are areas of Veatch loam and Cathedral loam. The Veatch soil makes up about 8 percent of the total acreage of this unit, and the Cathedral soil makes up 7 percent.

The Hesperus soil is deep and well drained. It formed in residuum derived dominantly from sandstone and shale. Typically, the surface layer is very dark gray and dark grayish brown loam about 7 inches thick. The subsoil is brown clay loam about 17 inches thick. The upper part of the substratum is dark yellowish brown clay loam about 13 inches thick. The lower part to a depth of 60 inches or more is brown clay loam.

Permeability is moderately slow in the Hesperus soil. The available water capacity is high. The effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is very severe.

The Empedrado soil is deep and well drained. It formed in residuum and colluvium derived dominantly from interbedded sandstone and shale. Typically, the surface layer is dark grayish brown loam about 10 inches thick. The upper part of the subsoil is yellowish brown clay loam about 11 inches thick. The next part is light olive brown gravelly sandy clay loam about 7 inches thick. The lower part of the subsoil to a depth of 60 inches or more is yellowish brown and pale brown loam.

Permeability is moderate in the Empedrado soil. The available water capacity also is moderate. The effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is very severe.

The Pagoda soil is deep and well drained. It formed in colluvium derived dominantly from shale. Typically,

the surface layer is dark grayish brown clay loam about 6 inches thick. The upper part of the subsoil is dark brown clay loam about 11 inches thick. The next part is brown clay about 23 inches thick. The lower part of the subsoil to a depth of 60 inches or more is brown clay loam.

Permeability is slow in the Pagoda soil. The available water capacity is moderate. The effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is very severe.

This unit is used for livestock grazing or as winter habitat for mule deer.

The potential plant community is mainly nodding brome, mountain brome, Gambel's oak, big bluegrass, elk sedge, Saskatoon serviceberry, and mountain snowberry. If range condition declines as a result of overgrazing, Gambel's oak, Saskatoon serviceberry, mountain snowberry, and forbs increase. If continued deterioration is allowed, Canada thistle, cheatgrass, and rabbitbrush invade. The average annual production of air-dry vegetation is about 2,000 pounds per acre. The suitability of this unit for range seeding is poor. The main limitations are the slope and restricted accessibility. Suitable management practices include proper grazing use, deferred grazing, and a planned grazing system.

If this unit is used for development of mineral resources, the main limitation is the slope. Areas of this unit are not stable and have a high potential for mass movement. Wet areas and sloping rock formations should be identified prior to any construction.

Preserving the existing plant cover during construction helps to control erosion. Topsoil can be stockpiled and used to reclaim areas disturbed during construction. Structures that divert runoff are needed if buildings and roads are constructed.

The Hesperus and Empedrado soils are a good source of reconstruction material for drastically disturbed areas. The upper 1½ feet of the Pagoda soil is a good source of this material. Below this depth, however, the Pagoda soil is a poor source because of a high content of clay.

The capability classification of this unit is 7e, nonirrigated. The unit is in the Brushy Loam ecological site #238.

49—Hesperus-Pagoda complex, 3 to 12 percent slopes

This map unit is on toeslopes and terraces. The native vegetation is mainly shrubs, grasses, and forbs. Elevation is 6,200 to 7,800 feet. The average annual precipitation is 18 to 22 inches, the average annual air temperature is 40 to 44 degrees F, and the average frost-free period is 85 to 100 days.

This unit is about 45 percent Hesperus soil and 40 percent Pagoda soil. The two soils occur as areas so intricately intermingled that mapping them separately was not practical at the scale used.

Included in mapping are small areas of Borpark stony loam and Empedrado loam.

The Hesperus soil is deep and well drained. It formed in residuum and colluvium derived dominantly from shale and sandstone. Typically, the surface layer is very dark gray and dark grayish brown loam about 7 inches thick. The upper part of the subsoil is brown clay loam about 17 inches thick. The lower part is dark yellowish brown clay loam about 13 inches thick. The substratum to a depth of 60 inches or more is brown clay loam.

Permeability is moderately slow in the Hesperus soil. The available water capacity is high. The effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion ranges from slight on the lower slopes to very severe in the steeper areas.

The Pagoda soil is deep and well drained. It formed in residuum and colluvium derived dominantly from shale and sandstone. Typically, the surface layer is dark grayish brown clay loam about 6 inches thick. The upper part of the subsoil is brown clay loam about 11 inches thick. The next part is brown clay about 23 inches thick. The lower part of the subsoil to a depth of 60 inches or more is brown clay loam.

Permeability is slow in the Pagoda soil. The available water capacity is moderate. The effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion ranges from slight on the lower slopes to very severe in the steeper areas.

This unit is used for irrigated hay and pasture or for livestock grazing.

If this unit is used for hay and pasture, the main limitations are the uneven terrain and the slope. Seedbed preparation should be on the contour or across the slope where practical. Proper grazing practices, weed control, and fertilizer are needed to ensure maximum quality of forage. Irrigation water can be applied by the sprinkler or contour ditch methods.

The potential plant community is mainly mountain brome, nodding brome, elk sedge, Saskatoon serviceberry, mountain snowberry, and Gambel's oak. If range condition declines as a result of overgrazing, shrubs and forbs are the principal increasers. The average annual production of air-dry vegetation is about 2,000 pounds per acre.

These soils are only a fair source of reconstruction material for drastically disturbed areas because of a high content of clay in the subsoil.

The capability classification of this unit is 4e, irrigated and nonirrigated. The unit is in the Brushy Loam ecological site #238.

50—Irigul-Starman channery loams, 5 to 35 percent slopes

This map unit is on mountain ridges and on the crests and sides of hills. The native vegetation is mainly grass and shrubs. Elevation is 7,800 to 8,400 feet. The average annual precipitation is 18 to 22 inches, the average annual air temperature is 36 to 40 degrees F, and the average frost-free period is 65 to 90 days.

This unit is about 40 percent Irigul soil and 30 percent Starman soil. The two soils occur as areas so intricately intermingled that mapping them separately was not practical at the scale used. The Irigul soil is on ridge shoulders, and the Starman soil is on ridgetops.

Included in mapping are small areas of Parachute loam and areas of sandy loam. Included areas make up about 30 percent of the total acreage of this unit.

The Irigul soil is shallow and well drained. It formed in residuum derived dominantly from sandstone or hard shale. Typically, the surface layer is brown channery loam about 6 inches thick. The subsoil is brown very channery loam about 7 inches thick. Bedrock is at a depth of about 13 inches.

Permeability is moderate in the Irigul soil. The available water capacity is very low. The effective rooting depth is 10 to 20 inches. Runoff is medium or rapid, and the hazard of water erosion is moderate to very severe.

The Starman soil is shallow and well drained. It formed in residuum derived dominantly from sandstone or hard shale. Typically, the surface layer is pale brown channery loam about 6 inches thick. The underlying material is light yellowish brown extremely channery loam about 5 inches thick. Bedrock is at a depth of about 11 inches.

Permeability is moderate in the Starman soil. The available water capacity is very low. The effective rooting depth is 8 to 20 inches. Runoff is medium or rapid, and the hazard of water erosion is moderate to very severe.

This unit is used for livestock grazing.

The potential plant community on the Irigul soil is mainly western wheatgrass, prairie Junegrass, bluebunch wheatgrass, mountain big sagebrush, and Saskatoon serviceberry. If range condition declines as a result of overgrazing, forbs, rabbitbrush, mountain big sagebrush, mountain snowberry, and Saskatoon serviceberry will increase. The average annual production of air-dry vegetation is about 900 pounds per acre.

The potential plant community on the Starman soil is mainly bluebunch wheatgrass, Indian ricegrass, needleandthread, streambank wheatgrass, winterfat, and prairie sagewort. If range condition declines as a result of overgrazing, vigor will be reduced and the extent of bare ground will increase. The average annual production of air-dry vegetation is about 400 pounds per acre.

If the range is in poor condition, seeding is a suitable practice in areas where slopes are less than 15 percent. Adapted native species are western wheatgrass, bluebunch wheatgrass, streambank wheatgrass, and winterfat.

The Irigul and Starman soils are a poor source of reconstruction material for drastically disturbed areas because of the restricted available water capacity and large stones.

The capability classification of this unit is 7e, nonirrigated. The Irigul soil is in the Loamy Slopes ecological site #303, and the Starman soil is in the Dry Exposure ecological site #235.

51—Mesa-Avalon complex, 3 to 12 percent slopes

This map unit is on fans and benches. The native vegetation is mainly grasses and shrubs. Elevation is 4,800 to 5,600 feet. The average annual precipitation is 7 to 11 inches, the average annual air temperature is 50 to 53 degrees F, and the average frost-free period is 120 to 130 days.

This unit is about 50 percent Mesa very fine sandy loam and 35 percent Avalon loam. The two soils occur as areas so intricately intermingled that mapping them separately was not practical at the scale used. The Mesa soil is on fans and benches (fig. 12), and the Avalon soil is on bench edges.

Included in mapping are small areas of Chipeta and Persayo silty clay loams. Included areas make up about 15 percent of the total acreage of this unit.

The Mesa soil is deep and well drained. It formed in alluvium derived dominantly from sedimentary rock. Slope ranges from 3 to 12 percent. Typically, the surface layer is brown very fine sandy loam about 3 inches thick. The upper part of the subsoil is brown clay loam about 14 inches thick. The next part is light brown clay loam about 9 inches thick. The lower part of the subsoil is pink very gravelly clay loam about 8 inches thick. The substratum to a depth of 60 inches or more is light brown very gravelly loam.

Permeability is slow in the Mesa soil. The available

Figure 12.—An area of Mesa very fine sandy loam. Badlands are in the background.

water capacity is moderate. The effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate to very severe.

The Avalon soil is deep and well drained. It formed in alluvium derived dominantly from sedimentary rock. Slope ranges from 3 to 12 percent. Typically, the surface layer is brown loam about 6 inches thick. The upper part of the subsoil is light yellowish brown and light gray loam about 34 inches thick. The lower part to a depth of 60 inches or more is very pale brown gravelly sandy loam.

Permeability is moderate in the Avalon soil. The available water capacity also is moderate. The effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate to very severe.

This unit is used as rangeland.

The potential plant community is mainly galleta, Indian ricegrass, Wyoming big sagebrush, and shadscale saltbush. If range condition declines as a result of overgrazing, Gardner's saltbush, yellow rabbitbrush, broom snakeweed, and plains pricklypear increase. If continued deterioration is allowed, cheatgrass, halogeton, Russian thistle, and annual mustard invade. The average annual production of air-dry vegetation is about 650 pounds per acre on the Mesa soil and 700 pounds per acre on the Avalon soil.

Range seeding is desirable if the range is in poor condition. Successful seedings can be expected only in years when precipitation is above average. Suitable native grass seeding mixtures include galleta and Indian ricegrass. Crested wheatgrass and Russian wildrye are introduced species that are suitable for pasture use. The plants selected for seeding should meet the seasonal requirements of livestock, wildlife, or both. Seeding late in fall helps to ensure

establishment of seedlings the following spring when the content of moisture in the soil is more likely to be adequate. Suitable management practices include proper grazing use, deferred grazing, and a planned grazing system.

If this unit is used for development of mineral resources, the main limitations are seepage, piping, and the slope. This unit is limited for use as water impoundments mainly because of the piping potential.

The hazard of erosion is increased if the soils are left exposed during building site development. Preserving the existing plant cover during construction helps to control erosion. Structures that divert runoff are needed if buildings and roads are constructed.

The Mesa and Avalon soils are only a fair source of reconstruction material for drastically disturbed areas because of excess lime.

The capability classification of this unit is 7e, nonirrigated. The unit is in the Loamy Saltdesert ecological site #401.

52—Northwater-Adel complex, 5 to 50 percent slopes

This map unit is on mountainsides and footslopes and in swales. The native vegetation is mainly quaking aspen, shrubs, and grasses. Elevation is 7,700 to 8,400 feet. The average annual precipitation is 18 to 25 inches, the average annual air temperature is 36 to 40 degrees F, and the average frost-free period is 45 to 75 days.

This unit is about 50 percent Northwater soil and 40 percent Adel soil. The two soils occur as areas so intricately intermingled that mapping them separately was not practical at the scale used. The Northwater soil is on mountainsides, and the Adel soil is on footslopes and in swales.

Included in mapping are small areas of Rhone loam.

The Northwater soil is deep and well drained. It formed in residuum and colluvium derived dominantly from sedimentary rock. Typically, the surface layer is dark grayish brown loam about 28 inches thick. The subsoil is yellowish brown very channery loam about 20 inches thick. The substratum to a depth of 60 inches or more is yellowish brown extremely channery loam.

Permeability is moderate in the Northwater soil. The available water capacity also is moderate. The effective rooting depth is 60 inches or more. Runoff is medium or rapid, and the hazard of water erosion is severe or very severe.

The Adel soil is deep and well drained. It formed in colluvium derived dominantly from sedimentary rock. Typically, the surface layer is dark grayish brown clay loam about 20 inches thick. The subsoil is brown clay loam about 11 inches thick. The substratum to a depth of 60 inches or more is brown clay loam.

Permeability is moderate in the Adel soil. The available water capacity is high. The effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is severe or very severe.

Most areas of this unit are used for livestock grazing, wood products, or wildlife habitat.

The potential plant community on the Northwater soil is mainly quaking aspen and an understory of slender wheatgrass, nodding brome, mountain brome, Columbia needlegrass, mountain snowberry, and many forbs. Areas of this soil can be very valuable for grazing of livestock. The potential production of the native understory vegetation in normal years is about 3,000 pounds of air-dry vegetation per acre.

The potential plant community on the Adel soil is subalpine fir and Engelmann's spruce and an understory of elk sedge, grouse whortleberry, heartleaf arnica, and silvery lupine. The Adel soil generally supports quaking aspen and an understory of slender wheatgrass, nodding brome, Columbia needlegrass, mountain snowberry, and blue wildrye. The potential production of the native understory vegetation in normal years is about 300 pounds air-dry vegetation per acre. Where quaking aspen is dominant, the potential production is about 2,800 pounds per acre.

This unit is generally not suitable for seeding because of the slope. Suitable management practices include proper range use, deferred grazing, and a planned grazing system.

The Northwater soil is suited to the production of quaking aspen. The site index for quaking aspen ranges from 50 to 70. Based on a site index of 58 for quaking aspen, this soil can produce 31 cubic feet of wood per acre per year. The main concerns affecting the production and harvesting of timber are the slope and the low precipitation.

The Adel soil also is suited to the production of quaking aspen. The site index for quaking aspen ranges from 50 to 70. Based on a site index of 57 for quaking aspen, this soil can produce 30 cubic feet of wood per acre per year. In the small areas that support subalpine fir, the site index for subalpine fir ranges from 80 to 100. Based on a site index of 87 for subalpine fir, this soil can produce 86 cubic feet of wood per acre per year. The main concerns affecting the production and harvesting of timber are the slope and the low precipitation. The slope also limits the kinds of equipment that can be used in forest management.

The upper 2 feet of the Northwater soil is a good source of reconstruction material for drastically disturbed areas. Below this depth, however, the Northwater soil is a poor source of this material because of large stones. The Adel soil is a good source of reconstruction material.

The capability classification of this unit is 7e, nonirrigated. The Northwater soil is in the Quaking Aspen ecological site, and the Adel soil is in the Engelmann's Spruce/Subalpine Fir ecological site.

53—Pagoda-Hesperus complex, 12 to 40 percent slopes

This map unit is on foothills and old mudflows. It formed in colluvium and alluvium derived dominantly from shales. The native vegetation is mainly shrubs, grasses, and forbs. Elevation is 7,400 to 8,000 feet. The average annual precipitation is 18 to 22 inches, the average annual air temperature is about 41 degrees F, and the average frost-free period is 75 to 85 days.

This unit is about 50 percent Pagoda soil and 20 percent Hesperus soil. The two soils occur as areas so intricately intermingled that mapping them separately was not practical at the scale used. The Hesperus soil is in areas of the more recently deposited alluvium, either on toeslopes of alluvial fans or in narrow swales.

Included in mapping are areas of Fughes clay loam. Also included are small areas of moderately deep soils or soils that contain as much as 35 percent rock fragments in the substratum. Included areas make up about 30 percent of the total acreage of this unit. The percentage varies from one mapped area to another.

The Pagoda soil is deep and well drained. It formed in colluvium and old mudflows derived dominantly from shale. Typically, the surface layer is dark grayish brown clay loam about 6 inches thick. The upper part of the subsoil is brown clay loam about 11 inches thick. The next part is brown clay about 23 inches thick. The lower part of the subsoil to a depth of 60 inches or more is brown clay loam.

Permeability is slow in the Pagoda soil. The available water capacity is moderate. The effective rooting depth is 60 inches or more. Runoff is medium or rapid, and the hazard of water erosion is very severe.

The Hesperus soil is deep and well drained. It formed in colluvium and alluvium derived dominantly from shale. Typically, the surface layer is very dark gray and dark grayish brown loam about 7 inches thick. The upper part of the subsoil is brown clay loam about 17 inches thick. The lower part is dark yellowish brown clay loam about 13 inches thick. The substratum to a depth of 60 inches or more is brown clay loam.

Permeability is moderately slow in the Hesperus soil. The available water capacity is high. The effective rooting depth is 60 inches or more. Runoff is medium or rapid, and the hazard of water erosion is very severe.

This unit is used mainly for livestock grazing. It is also used as wildlife habitat.

The potential plant community is mainly Gambel's oak, nodding brome, mountain brome, elk sedge, Saskatoon serviceberry, and Columbia needlegrass. If range condition declines as a result of overgrazing, the shrubs respond as increasers. If continued deterioration is allowed, Kentucky bluegrass, tall rabbitbrush, downy brome, and Canada thistle invade. The average annual production of air-dry vegetation is about 2,000 pounds per acre.

If the range is in poor condition, seeding is a suitable practice in areas where slopes are less than 15 percent. Adapted native grasses are mountain brome, western wheatgrass, slender wheatgrass, and muttongrass. For pasture production, introduced grasses that may be considered in a seed mixture are pubescent wheatgrass, intermediate wheatgrass, smooth brome, and orchardgrass. Brush management can be used to restore this site to near its potential plant community if proper range use, deferred grazing, and a planned grazing system also are applied.

These soils are only a fair source of reconstruction material for drastically disturbed areas because of a high content of clay in the subsoil.

The capability classification of this unit is 6e, nonirrigated. The unit is in the Brushy Loam ecological site #238.

54—Panitchen loam, 1 to 6 percent slopes

This deep, well drained soil is on low terraces and flood plains. It formed in alluvium derived dominantly from mixed materials. The native vegetation is mainly grass and shrubs. Elevation is 4,800 to 5,800 feet. The average annual precipitation is 12 to 16 inches, the average annual air temperature is 48 to 52 degrees F, and the average frost-free period is 95 to 130 days.

Typically, the surface layer is light gray loam about 7 inches thick. The upper part of the underlying material is pale brown, stratified gravelly loam and gravelly clay loam about 22 inches thick. The lower part to a depth of 60 inches or more is light yellowish brown, stratified loam.

Included in mapping are small areas of Avalon loam, Youngston loam, and Cameo sandy loam. Also included are small areas of Panitchen soils that have a surface layer of sandy loam or clay loam.

Permeability is moderately slow in the Panitchen soil. The available water capacity is moderate. The effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight or moderate.

This unit is used for livestock grazing, irrigated hayland, or pasture.

This unit is well suited to hay and pasture. If it is used for hay and pasture, the main limitation is the roughness of the landscape. Leveling helps to ensure the uniform application of water. Grasses and legumes grow well if adequate fertilizer is used. Applications of nitrogen and phosphorus fertilizer promote good growth of forage plants. Proper grazing practices, weed control, and fertilizer are needed to ensure maximum quality of forage.

The potential plant community is mainly basin wildrye, western wheatgrass, streambank wheatgrass, and basin big sagebrush. If range condition declines as a result of overgrazing, rubber rabbitbrush and basin big sagebrush increase. If continued deterioration is allowed, cheatgrass, greasewood, Kentucky bluegrass, cactus, lambsquarter, mustard, and broom snakeweed invade and severe gully erosion can occur as a result of the lack of ground cover. The average annual production of air-dry vegetation is about 2,000 pounds per acre. Brush management can improve deteriorated areas of range that are producing more woody shrubs than were present in the potential plant community. Proper range use, deferred grazing, and a planned grazing system also are needed. If the range vegetation has seriously deteriorated, seeding is needed. Suitable native grass seeding mixtures include western wheatgrass, streambank wheatgrass, and basin wildrye. Some introduced species, including pubescent wheatgrass, bromegrass, and orchardgrass, can be used for pasture planting. The plants selected for seeding should meet the seasonal requirements of livestock, wildlife, or both. Seeding late in fall helps to ensure establishment of seedlings the following spring when the content of moisture in the soil is more likely to be adequate.

The Panitchen soil is only a fair source of reconstruction material for drastically disturbed areas because of excess lime.

The capability classification is 3e, irrigated, and 4e, nonirrigated. This unit is in the Foothill Swale ecological site #285.

55—Parachute-Irigul complex, 5 to 30 percent slopes

This map unit is on mountain ridges and on the crests and sides of hills. The native vegetation is mainly grass and shrubs. Elevation is 7,600 to 8,800 feet. The average annual precipitation is 18 to 22 inches, the average annual air temperature is 36 to 40 degrees F, and the average frost-free period is 65 to 90 days.

This unit is about 60 percent Parachute soil and 30 percent Irigul soil. The Parachute soil is on the mountain ridges, and the Irigul soil is on the convex crests and mountainsides. The two soils occur as areas so intricately intermingled that mapping them separately was not practical at the scale used.

Included in mapping are small areas of Rhone loam, Silas loam, and Northwater loam. Included areas make up about 10 percent of the total acreage of this unit.

The Parachute soil is moderately deep and is well drained. It formed in residuum derived dominantly from sandstone, siltstone, or hard shale. Typically, the surface layer is grayish brown loam about 10 inches thick. The subsoil is brown very channery loam about 15 inches thick. Rippable, fractured siltstone is at a depth of about 25 inches.

Permeability is moderate in the Parachute soil. The available water capacity is very low. The effective rooting depth is 20 to 40 inches. Runoff is medium or rapid, and the hazard of water erosion is moderate to very severe.

The Irigul soil is shallow and well drained. It formed in residuum derived dominantly from sandstone or hard shale. Typically, the surface layer is brown channery loam about 6 inches thick. The subsoil is brown very channery loam about 7 inches thick. Hard siltstone is at a depth of about 13 inches.

Permeability is moderate in the Irigul soil. The available water capacity is very low. The effective rooting depth is 10 to 20 inches. Runoff is medium or rapid, and the hazard of water erosion is moderate to very severe.

This unit is used for livestock grazing.

The potential plant community on the Parachute soil is mainly Arizona fescue, Columbia needlegrass, slender wheatgrass, Letterman's needlegrass, and mountain big sagebrush. If range condition declines as a result of overgrazing, less palatable grasses, such as bottlebrush squirreltail, forbs, and most of the shrubs increase. The average annual production of air-dry vegetation is about 1,500 pounds per acre.

The potential plant community on the Irigul soil is

mainly western wheatgrass, prairie Junegrass, bluebunch wheatgrass, Saskatoon serviceberry, and mountain big sagebrush. If range condition declines as a result of overgrazing, forbs, rabbitbrush, mountain big sagebrush, mountain snowberry, and Saskatoon serviceberry will increase. The average annual production of air-dry vegetation is about 900 pounds per acre. If the range is overgrazed, the proportion of preferred forage plants decreases and the proportion of less preferred forage plants increases. Therefore, livestock grazing should be managed so that the desired balance of preferred species is maintained in the plant community.

If the range is in poor condition, seeding is a suitable practice in areas where slopes are less than 15 percent. Adapted native grasses are western wheatgrass, prairie Junegrass, and bottlebrush squirreltail. Introduced grasses that may be considered in a seeding mixture for pasture are pubescent wheatgrass and crested wheatgrass. Species selection should be based on the needs of livestock and wildlife. Suitable management practices include proper grazing use, deferred grazing, and a planned grazing system.

The upper 18 inches of the Parachute soil is a good source of reconstruction material for drastically disturbed areas. Below this depth, however, the Parachute soil is only a fair source of this material because of the limited available water capacity. The Irigul soil is only a fair source of reconstruction material because of the limited available water capacity.

The capability classification of this unit is 7e, nonirrigated. The Parachute soil is in the Mountain Loam ecological site #228, and the Irigul soil is in the Loamy Slopes ecological site #303.

56—Parachute-Irigul-Rhone association, 25 to 50 percent slopes

This map unit is on tops of mountains and ridges and on the crests and sides of hills. The native vegetation is mainly Gambel's oak, serviceberry, sagebrush, and grasses. Elevation is 7,600 to 8,800 feet. The average annual precipitation is 18 to 22 inches, the average annual air temperature is 36 to 40 degrees F, and the average frost-free period is 65 to 80 days.

This unit is about 35 percent Parachute loam, 30 percent Irigul channery loam, and 20 percent Rhone loam. The Parachute soil is on north- and west-facing side slopes, the Irigul soil is on ridges and south- and east-facing side slopes, and the Rhone soil is on toeslopes.

Included in mapping are small areas of Starman channery loam and Adel loam.

The Parachute soil is moderately deep and is well drained. It formed in colluvium and residuum derived dominantly from sandstone, siltstone, and hard shale. Slope ranges from 25 to 50 percent. Typically, the surface layer is grayish brown loam about 10 inches thick. The subsoil is brown very channery loam about 15 inches thick. Rippable, fractured siltstone is at a depth of about 25 inches.

Permeability is moderate in the Parachute soil. The available water capacity is very low. The effective rooting depth is 20 to 40 inches. Runoff is rapid, and the hazard of water erosion is very severe.

The Irigul soil is shallow and well drained. It formed in residuum derived dominantly from sandstone or hard shale. Slope ranges from 25 to 50 percent. Typically, the surface layer is brown channery loam about 6 inches thick. The subsoil is brown very channery loam about 7 inches thick. Hard shale is at a depth of about 13 inches.

Permeability is moderate in the Irigul soil. The available water capacity is very low. The effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is very severe.

The Rhone soil is deep and well drained. It formed in colluvium and residuum derived dominantly from sandstone or hard shale. Slope ranges from 25 to 50 percent. Typically, the surface layer is very dark grayish brown loam about 10 inches thick. The next layer is dark grayish brown channery loam about 29 inches thick. The subsoil is brown very channery loam about 16 inches thick. Rippable, fractured siltstone is at a depth of about 55 inches.

Permeability is moderate in the Rhone soil. The available water capacity is moderate. The effective rooting depth is 40 to 60 inches. Runoff is rapid, and the hazard of water erosion is very severe.

This unit is used for livestock grazing or as wildlife habitat.

The potential plant community on the Parachute and Rhone soils is mainly western wheatgrass, nodding brome, mountain brome, elk sedge, slender wheatgrass, Saskatoon serviceberry, and mountain snowberry. If range condition declines as a result of overgrazing, forbs, mountain big sagebrush, Saskatoon serviceberry, and mountain snowberry increase. Some areas support a few Gambel's oak trees. The average annual production of air-dry vegetation is about 2,000 pounds per acre.

The potential plant community on the Irigul soil is mainly western wheatgrass, prairie Junegrass, bluebunch wheatgrass, bottlebrush squirreltail, and mountain big sagebrush. If range condition declines as

a result of overgrazing, forbs, mountain big sagebrush, Saskatoon serviceberry, and mountain snowberry increase. The average annual production of air-dry vegetation is about 900 pounds per acre.

The slope limits access by livestock and results in overgrazing of the less sloping areas. Suitable management practices include proper range use, deferred grazing, and a planned grazing system. These practices in combination with brush management can restore this site to its potential climax plant community.

The soils in this unit are a good source of reconstruction material for drastically disturbed areas.

The capability subclass of this unit is 7e, nonirrigated. The Parachute and Rhone soils are in the Brushy Loam ecological site #238. The Irigul soil is in the Loamy Slopes ecological site #303.

57—Parachute-Rhone loams, 5 to 30 percent slopes

This map unit is on ridge crests, mountainsides, upland slopes, and side slopes. The native vegetation is mainly shrubs and grasses. Elevation is 7,600 to 8,800 feet. The average annual precipitation is 18 to 22 inches, the average annual air temperature is 36 to 40 degrees F, and the average frost-free period is 45 to 75 days.

This unit is about 55 percent Parachute loam and 35 percent Rhone loam. The two soils occur as areas so intricately intermingled that mapping them separately was not practical at the scale used.

Included in mapping are small areas of Cathedral channery loam, Irigul channery loam, and Northwater loam on side slopes; Veatch loam on benches and in the less sloping areas; and Adel loam on gently sloping to steep, smooth or concave footslopes and side slopes and in upland swales. Also included are small areas of Rock outcrop.

The Parachute soil is moderately deep and is well drained. It formed in residuum derived dominantly from sandstone or hard siltstone. Typically, the surface layer is grayish brown loam about 10 inches thick. The subsoil is brown very channery loam about 15 inches thick. Rippable, fractured siltstone is at a depth of about 25 inches.

Permeability is moderate in the Parachute soil. The available water capacity is very low. The effective rooting depth is 20 to 40 inches. Runoff is medium or rapid, and the hazard of water erosion is moderate to very severe.

The Rhone soil is deep and well drained. It formed in residuum and colluvium derived dominantly from sandstone or shale. Typically, the surface layer is very dark grayish brown loam about 10 inches thick. The next layer is dark grayish brown channery loam about 29 inches thick. The subsoil is brown very channery loam about 16 inches thick. Rippable, fractured siltstone is at a depth of about 55 inches.

Permeability is moderate in the Rhone soil. The available water capacity also is moderate. The effective rooting depth is 40 to 60 inches. Runoff is medium or rapid, and the hazard of water erosion is moderate to very severe.

This unit is used mainly for livestock grazing or as wildlife habitat.

The potential plant community is mainly Arizona fescue, Columbia needlegrass, slender wheatgrass, Letterman's needlegrass, elk sedge, and mountain big sagebrush. If range condition declines as a result of excessive grazing, many forbs, some shrub species, muttongrass, Nevada bluegrass, and Sandberg bluegrass respond as increasers. If continued deterioration is allowed, pingue hymenoxys, tall rabbitbrush, plains pricklypear, and annuals invade. The average annual production of air-dry vegetation is about 1,500 pounds per acre. Brush management can improve deteriorated areas of range that are producing more woody shrubs than were present in the potential plant community.

If the range is in poor condition, seeding is a suitable practice in areas where slopes are less than 15 percent. Suitable seeding mixtures include Arizona fescue, western wheatgrass, slender wheatgrass, Letterman's needlegrass, and Parry oatgrass. Introduced species that can be seeded for pasture include pubescent wheatgrass, bromegrass, and intermediate wheatgrass. The plants selected for seeding should meet the seasonal requirements of livestock, wildlife, or both. Seeding late in fall helps to ensure establishment of seedlings the following spring when the content of moisture in the soil is more likely to be adequate. Suitable management practices include proper grazing use, deferred grazing, and a planned grazing system.

The upper 18 inches of the Parachute soil is a good source of reconstruction material for drastically disturbed areas. Below this depth, however, the Parachute soil is only a fair source of this material because of the restricted available water capacity. The upper 36 inches of the Rhone soil is a good source of reconstruction material. Below this depth, the Rhone soil is only a fair source of this material because of the limited available water capacity.

The capability classification of this unit is 6e, nonirrigated. The unit is in the Mountain Loam ecological site #228.

58—Peninsula loam, 3 to 9 percent slopes

This deep, well drained soil is on benches. It formed in mixed transported materials derived dominantly from sedimentary rock and volcanic sources. The native vegetation is mainly shrubs and perennial grasses. Elevation is 6,200 to 6,800 feet. The average annual precipitation is 15 to 19 inches, the average annual air temperature is 42 to 45 degrees F, and the average frost-free period is 85 to 110 days.

Typically, the surface layer is dark grayish brown loam about 4 inches thick. The upper part of the subsoil is reddish brown clay loam about 15 inches thick. The next part is brown clay loam about 9 inches thick. The lower part of the subsoil is pinkish white and white loam about 12 inches thick. The substratum to a depth of 60 inches or more is very pale brown loam. In some areas the surface layer is clay loam or stony loam.

Included in mapping are small areas of Barx loam, Clapper stony loam, Empedrado loam, Golime stony loam, Hesperus loam, and Pagoda clay loam. Also included are small areas of wet soils and soils that contain more than 40 percent clay. Included areas make up about 30 percent of the total acreage of this unit. The percentage varies from one mapped area to another.

Permeability is moderately slow in the Peninsula soil. The available water capacity is high. The effective rooting depth is 60 inches or more. Runoff is slow or medium, and the hazard of water erosion is moderate or severe.

This unit is used mainly for hay and pasture or small grain. It is also used for range or as wildlife habitat.

This unit is suited to hay and pasture and to small grain crops. The main limitations are the short growing season and the hazard of water erosion.

The potential plant community is mainly needleandthread, western wheatgrass, muttongrass, and mountain big sagebrush. If the condition of the understory deteriorates, forbs, big sagebrush, Saskatoon serviceberry, and mountain snowberry increase. The average annual production of air-dry vegetation is about 1,500 pounds per acre.

Range seeding is suitable if the range is in poor condition. Adapted native grasses are needleandthread, western wheatgrass, and muttongrass. Introduced grasses that may be considered in a seed mixture for pasture are pubescent wheatgrass, crested wheatgrass, and intermediate wheatgrass. Brush management can improve deteriorated areas of range that are producing more woody shrubs than were present in the potential plant community. Suitable management practices include proper range use, deferred grazing, and a planned grazing system.

The Peninsula soil is moderately suited to homesite development. The main limitations are the shrink-swell potential, the frost hazard, and low strength. The effects of shrinking and swelling can be minimized by using proper engineering designs and by backfilling with material that has a low shrink-swell potential. The content of coarse fragments somewhat limits the suitability of this soil for basement excavation in many areas.

The surface layer of the Peninsula soil is a good source of reconstruction material for drastically disturbed areas. The underlying layers are only a fair source of this material because of the high content of clay and excess lime.

The capability classification is 4e, irrigated and nonirrigated. This unit is in the Deep Loam ecological site #292.

59—Persayo silty clay loam, 3 to 25 percent slopes

This shallow, well drained soil is on upland hills. It formed in residuum derived dominantly from shale. The native vegetation is mainly sparse stands of salt-tolerant desert shrubs and grasses. Elevation is 5,100 to 5,800 feet. The average annual precipitation is 7 to 10 inches, the average annual air temperature is 46 to 52 degrees F, and the average frost-free period is 125 to 150 days.

Typically, the surface layer is light brownish gray silty clay loam about 3 inches thick. The subsoil also is light brownish gray silty clay loam. It is about 5 inches thick. The substratum is silty clay loam about 7 inches thick. Shale is at a depth of about 15 inches.

Included in mapping are small areas of Billings silty clay loam, Chipeta silty clay loam, and Youngston loam. Also included are small areas of shale outcropping and soils that are severely gullied and entrenched. Included areas make up about 15 percent of the total acreage of this unit. The percentage varies from one mapped area to another.

Permeability is moderately slow in the Persayo soil. The available water capacity is very low. The effective rooting depth is 7 to 20 inches. Runoff is rapid, and the hazard of water erosion is moderate to very severe.

This unit is used for limited livestock grazing.

The potential plant community is mainly galleta, Indian ricegrass, Salina wildrye, and shadscale saltbush. If range condition declines as a result of overgrazing, desert low rabbitbrush and forbs

increase. If continued deterioration is allowed, halogeton, Russian thistle, and cheatgrass invade. The average annual production of air-dry vegetation is about 500 pounds per acre.

Range seeding is suitable if the range is in poor condition. Seeding late in fall helps to ensure establishment of seedlings the following spring when the content of moisture in the soil is more likely to be adequate. Adapted native grasses are galleta, needleandthread, and Salina wildrye. Introduced grasses that may be considered in a seed mixture are Russian wildrye and crested wheatgrass. The plants selected for seeding should meet the seasonal requirements of livestock, wildlife, or both. Successful seedings can be expected only in years when precipitation is above average. Suitable management practices include proper range use, deferred grazing, and a planned grazing system.

The Persayo soil is a poor source of reconstruction material for drastically disturbed areas because of the severe hazard of erosion.

The capability classification is 7e, nonirrigated. This unit is in the Silty Saltdesert ecological site #410.

60—Redcreek-Rentsac complex, 5 to 40 percent slopes

This map unit is on mountainsides and ridges of dissected plateaus. The native vegetation is mainly twoneedle pinyon and juniper and an understory of shrubs and grasses. Elevation is 6,000 to 7,400 feet. The average annual precipitation is 12 to 15 inches, the average annual air temperature is 42 to 45 degrees F, and the average frost-free period is 85 to 105 days.

This unit is about 60 percent Redcreek soil and 30 percent Rentsac soil. The two soils occur as areas so intricately intermingled that mapping them separately was not practical at the scale used.

Included in mapping are small areas of soils that have a surface layer of loam and areas of Rock outcrop. Also included are small areas of soils that are similar to the Redcreek and Rentsac soils but are 20 to 40 inches deep to bedrock. Included areas make up about 10 percent of the total acreage of this unit. The percentage varies from one mapped area to another.

The Redcreek soil is shallow and well drained. It formed in sandy eolian material and residuum derived dominantly from calcareous sandstone. Slope ranges from 5 to 30 percent. Typically, the surface layer is brown sandy loam about 4 inches thick. The upper part of the underlying material also is brown sandy loam. It is about 7 inches thick. The lower part of the underlying material is channery sandy loam about 5 inches thick. Sandstone is at a depth of about 16 inches.

Permeability is moderately rapid in the Redcreek soil. The available water capacity is very low. The effective rooting depth is 10 to 20 inches. Runoff is medium or rapid, and the hazard of water erosion is severe or very severe.

The Rentsac soil is shallow and well drained. It formed in residuum derived dominantly from calcareous sandstone. Slope ranges from 5 to 40 percent. Typically, the surface layer is grayish brown channery loam about 3 inches thick. The upper part of the underlying material is channery loam about 3 inches thick. The lower part is very channery loam about 13 inches thick. Sandstone is at a depth of about 19 inches.

Permeability is moderately rapid in the Rentsac soil. The available water capacity is very low. The effective rooting depth is 10 to 20 inches. Runoff is medium or rapid, and the hazard of water erosion is moderate to very severe.

This unit is used mainly for livestock grazing, wood products, or wildlife habitat.

The potential plant community is mainly twoneedle pinyon, scattered juniper, and an understory of prairie Junegrass, western wheatgrass, bluebunch wheatgrass, muttongrass, and Gambel's oak. If the condition of the understory deteriorates because of overgrazing and overstory competition, shrubs, juniper, and twoneedle pinyon will respond as increasers. The potential production of the native understory vegetation in normal years is 500 pounds per acre on the Redcreek soil and 550 pounds per acre on the Rentsac soil.

If the range is in poor condition, seeding is a suitable practice in areas where slopes are less than 15 percent. Adapted native grasses are bluebunch wheatgrass, western wheatgrass, and muttongrass. Introduced grasses that may be considered in a seed mixture are pubescent wheatgrass and crested wheatgrass. If twoneedle pinyon is removed to increase forage production, Gambel's oak may become dominant. Suitable management practices include proper grazing use, deferred grazing, and a planned grazing system.

The Redcreek soil is suited to the production of firewood and posts. The site index for twoneedle pinyon and juniper ranges from 95 to 115. Based on a site index of 105 for twoneedle pinyon and juniper, this soil can produce 16 cubic feet of wood per acre per year. The main concerns affecting the production and harvesting of timber are the restricted rooting depth, droughtiness, and the slope.

The Rentsac soil is suited to the production of wood. The site index for twoneedle pinyon and juniper ranges from 55 to 75. Based on a site index of 65 for twoneedle pinyon and juniper, this soil can produce 6.7 cubic feet of wood per acre per year. The main concerns affecting the production and harvesting of timber are the slope, the restricted rooting depth, and droughtiness. Twoneedle pinyon and juniper have limited economic value. Minimizing the removal of organic litter from the surface helps to maintain a high rate of water infiltration, reduces the runoff rate, and helps to maintain an adequate source of nutrients for trees. Seeding grasses after twoneedle pinyon and juniper have been thinned or harvested helps to control erosion. Thinning the overstory generally enhances reproduction and promotes the growth of grass and younger trees. Deferring grazing for at least 2 years after wood harvest helps to ensure the development of sufficient plant cover to protect the soil from erosion.

The capability classification of this unit is 7e, nonirrigated. The unit is in the Mountain Pinyon ecological site #448.

61—Rock outcrop-Torriorthents complex, 15 to 90 percent slopes

This map unit is on south-facing slopes of mountains, hills, ridges, and canyonsides in extremely rough and eroded areas. It supports only sparse vegetation. Elevation is 5,100 to 8,500 feet. The average annual precipitation is 8 to 18 inches, the average annual air temperature is 40 to 50 degrees F, and the average frost-free period is 70 to 130 days.

This unit is about 65 percent Rock outcrop and 30 percent Torriorthents. The two components occur as areas so intricately intermingled that mapping them separately was not practical at the scale used.

Included in mapping are Cathedral loam and Veatch loam. Included areas make up about 5 percent of the total acreage of this unit.

Rock outcrop consists of barren escarpments, ridge caps, and rocky points of sandstone, shale, limestone, or siltstone. The escarpments commonly are 3 to 100 feet high and 25 to 2,500 feet long.

Torriorthents commonly are very shallow and shallow over hard bedrock. These soils are well drained. They formed in residuum and colluvium derived from sandstone, shale, or siltstone. No single profile is typical of Torriorthents, but a common profile in the survey area has a surface layer of pale brown channery loam about 2 inches thick. The underlying material is very channery loam about 11 inches thick. Sandstone is at a depth of about 13 inches. In some areas the surface layer is stony or flaggy.

Runoff is very rapid in areas of this unit, and the hazard of water erosion is very severe.

The vegetation in areas of the Torriorthents is shadscale saltbush, Salina wildrye, Indian ricegrass, and bluebunch wheatgrass. Livestock grazing is impractical because of the sparseness of vegetation, the slope, and limited accessibility.

If this unit is used for development of mineral resources, the main limitations are the slope and the Rock outcrop. Access roads should be designed with an adequate cut-slope grade, and drains are needed to control surface runoff and keep soil losses to a minimum.

This unit is a poor source of reconstruction material for drastically disturbed areas.

The capability classification of the Torriorthents is 8e, nonirrigated. The Torriorthents are in the Pinyon/Juniper ecological site.

62—Shawa loam, 3 to 20 percent slopes

This deep, well drained soil is on structural benches. It formed in alluvium and colluvium derived dominantly from Green River shale. The native vegetation is mainly sagebrush, snowberry, Gambel's oak, and wheatgrasses. Elevation is 6,800 to 7,400 feet. The average annual precipitation is 16 to 18 inches, the average annual air temperature is 40 to 45 degrees F, and the average frost-free period is 85 to 110 days.

Typically, the surface layer is dark brown loam about 3 inches thick. The next layer is brown loam about 17 inches thick. The subsoil also is brown loam. It is about 31 inches thick. The substratum to a depth of 60 inches or more is brown loam.

Included in mapping are small areas of Hesperus loam, Tosca channery loam, Yamo sandy clay loam, and Utso channery loam.

Permeability is moderate in the Shawa soil. The available water capacity is high. The effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is slight to very severe.

This unit is used for livestock grazing or as wildlife habitat.

The potential plant community is mainly western wheatgrass, needleandthread, prairie Junegrass, muttongrass, and mountain big sagebrush. If range condition declines as a result of overgrazing, mountain big sagebrush, muttongrass, low rabbitbrush, and snowberry will respond as increasers. If continued deterioration is allowed, Utah juniper, twoneedle

pinyon, Kentucky bluegrass, and cheatgrass invade. The average annual production of air-dry vegetation is about 1,500 pounds per acre.

If the range is in poor condition, seeding is a suitable practice in areas where slopes are less than 15 percent. Adapted native grasses are western wheatgrass, muttongrass, and needleandthread. Introduced grasses that may be considered in a seed mixture for pasture planting are pubescent wheatgrass, smooth brome, and intermediate wheatgrass. Seeding late in fall helps to ensure establishment of seedlings the following spring when the content of moisture in the soil is more likely to be adequate. The plants selected for seeding should meet the seasonal requirements of livestock, wildlife, or both. Brush management can improve deteriorated areas of range that are producing more woody shrubs than were present in the potential plant community. Suitable management practices include proper range use, deferred grazing, and a planned grazing system.

The upper 30 inches of the Shawa soil is a good source of reconstruction material for drastically disturbed areas. Below this depth, the Shawa soil is only a fair source of this material because of excess lime.

The capability classification is 4e, nonirrigated. This unit is in the Deep Loam ecological site #292.

63—Silas loam, 1 to 12 percent slopes

This deep, moderately well drained soil is on alluvial valley floors. It formed in alluvium derived dominantly from mixed sedimentary rocks. The native vegetation is mainly sagebrush, grasses, and forbs. Elevation is 7,800 to 8,400 feet. The average annual precipitation is 20 to 25 inches, the average annual air temperature is 36 to 40 degrees F, and the average frost-free period is 65 to 90 days.

Typically, the surface layer is dark grayish brown loam about 18 inches thick. The upper part of the underlying material is dark grayish brown clay loam about 27 inches thick. The lower part to a depth of 60 inches or more is grayish brown clay loam.

Included in mapping are small areas of Rhone loam on the steeper slopes. Included areas make up about 15 percent of the total acreage of this unit.

Permeability is moderate in the Silas soil. The available water capacity is high. The effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight to very severe. The less sloping areas are subject to flooding as a result of run-on from the surrounding steeper areas.

This unit is used for livestock grazing or as wildlife habitat.

The potential plant community is mainly basin wildrye, western wheatgrass, Columbia needlegrass, slender wheatgrass, and mountain big sagebrush. If range condition declines as a result of overgrazing, mountain big sagebrush and the less palatable forbs increase. If continued deterioration is allowed, cheatgrass, thistle, mustard, dandelion, annual weeds, and Kentucky bluegrass invade. The average annual production of air-dry vegetation is about 2,500 pounds per acre.

Range seeding is suitable if the range is in poor condition. Seeding late in fall helps to ensure establishment of seedlings the following spring when the content of moisture in the soil is more likely to be adequate. Adapted native grasses are basin wildrye, western wheatgrass, streambank wheatgrass, Columbia needlegrass, Letterman's needlegrass, and slender wheatgrass. Introduced grasses that may be considered in a seed mixture for pasture planting are smooth brome, orchardgrass, and intermediate wheatgrass. Brush management can improve deteriorated areas of range that are producing more woody shrubs than were present in the potential plant community. Suitable management practices include proper range use, deferred grazing, and a planned grazing system.

This soil is a good source of reconstruction material for drastically disturbed areas.

The capability classification is 6e, nonirrigated. This unit is in the Mountain Swale ecological site #245.

64—Torrifluvents-Gullied land complex, 0 to 2 percent slopes

This map unit is on eroded fans, in swales, and along narrow valley bottoms. Slope ranges from 0 to 8 percent. Individual areas of this unit are long and narrow or irregularly shaped and range from 40 to 100 acres in size. The vegetation is mainly greasewood, sagebrush, annual grasses, and forbs. Elevation is 5,000 to 6,500 feet. The average annual precipitation is 7 to 18 inches, the average annual air temperature is 40 to 52 degrees F, and the average frost-free period is 85 to 175 days.

This unit is about 40 percent Torrifluvents and 40 percent Gullied land. The Gullied land is characterized by gullies and headcuts 3 to 25 feet deep and 5 to 100 feet wide. The two components of this unit occur as areas so intricately intermingled that mapping them separately was not practical at the scale used.

Typically, Torrifluvents are deep and are well drained to somewhat excessively drained. They formed in calcareous alluvium derived dominantly from mixed sources. A typical profile of Torrifluvents in the

survey area has a surface layer of grayish brown loam about 6 inches thick. The underlying material to a depth of 60 inches or more is stratified sandy loam, loam, and clay loam.

Included in mapping are small areas of Battlement loam, Panitchen loam, Cameo fine sandy loam, and Cowestglen sandy loam.

Permeability is moderately slow to moderately rapid in the Torrifluvents. The available water capacity is low to high. The effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is very severe. This unit is subject to rare flooding for brief periods in the spring and summer as a result of heavy thunderstorms.

Gullied land consists of areas where soil horizons have been removed by water, resulting in a network of V-shaped or U-shaped channels. Some areas resemble miniature badlands. Generally, gullies are so deep that extensive reshaping is necessary for most uses.

This unit is used as wildlife habitat.

The capability classification of the Torrifluvents is 8e, nonirrigated. The ecological site for the Torrifluvents is similar to Saltdesert Overflow #407.

65—Torriorthents, cool-Rock outcrop complex, 35 to 90 percent slopes

This map unit is on steep, mainly south-facing slopes of mountains, hills, ridges, and canyonsides in extremely rough and eroded areas. The vegetation is mainly sparse shrubs and grass and some twoneedle pinyon and juniper. Elevation is 6,200 to 8,500 feet. The average annual precipitation is 16 to 20 inches, the average annual air temperature is 42 to 44 degrees F, and the average frost-free period is 85 to 100 days.

This unit is about 50 percent Torriorthents and 40 percent Rock outcrop. The two components occur as areas so intricately intermingled that mapping them separately was not practical at the scale used.

Included in mapping are areas of Cathedral loam and Veatch loam. Included areas make up about 10 percent of the total acreage of this unit.

Torriorthents commonly are very shallow to deep over hard or soft bedrock. These soils are well drained to somewhat excessively drained. They formed in residuum and colluvium derived from sandstone, shale, limestone, or siltstone. No single profile is typical of Torriorthents, but a common profile in the survey area has a surface layer of pale brown channery loam about 2 inches thick. The underlying material is very channery loam about 11 inches thick. Sandstone is at a depth of about 13 inches. In some areas the surface layer is stony or flaggy. Depth to shale or sandstone ranges from 4 to 60 inches. The soils are calcareous throughout.

Permeability is moderate or moderately rapid in the Torriorthents. The available water capacity is very low to moderate. The effective rooting depth is mainly 4 to 60 inches. Runoff is very rapid, and the hazard of water erosion is very severe.

Rock outcrop consists of barren escarpments, ridge caps, and rocky points of sandstone, shale, limestone, or siltstone. The escarpments commonly are 3 to 50 feet high and 25 to 2,500 feet long.

Most areas of this unit are used as wildlife habitat or for limited livestock grazing. A few areas are used for the development of coal and natural gas.

Plant species at the lower elevations of this unit are Salina wildrye, western wheatgrass, forbs, Wyoming big sagebrush, shadscale saltbush, Saskatoon serviceberry, Indian ricegrass, Mormon tea, fourwing saltbrush, and small low rabbitbrush and an overstory of Utah juniper and twoneedle pinyon. Plant species at the upper elevations include Indian ricegrass, western wheatgrass, forbs, Gambel's oak, and mountain big sagebrush and an overstory of Utah juniper and twoneedle pinyon. Some areas at the higher elevations are similar to areas in the Brushy Loam ecological site.

The twoneedle pinyon and Utah juniper have limited economic value. They are used as firewood, fence posts, or Christmas trees. In most areas, however, the slope limits access for harvesting wood products.

Because it is mainly on south-facing slopes, which are accessible in the winter, this unit is used extensively as winter range and cover for mule deer and elk.

In areas used for development of mineral resources, the main limitations are the shallow depth to rock, the Rock outcrop, and the slope. Areas of this unit are not stable and are subject to mass movement. Wet areas and sloping rock formations should be identified prior to any construction. Access roads should be designed with an adequate cut-slope grade, and drains are needed to control surface runoff and keep soil losses to a minimum.

The capability classification of the Torriorthents is 7e, nonirrigated. The Torriorthents are in the Pinyon/Juniper ecological site.

66—Torriorthents, warm-Rock outcrop complex, 35 to 90 percent slopes

This map unit is on steep, mainly south-facing slopes of mountains, hills, ridges, and canyon sides in extremely rough and eroded areas. The native vegetation is mainly sparse shrubs and grass and some twoneedle pinyon and juniper. Elevation is 5,100

to 6,200 feet. The average annual precipitation is 9 to 16 inches, the average annual air temperature is 48 to 52 degrees F, and the average frost-free period is 95 to 130 days.

This unit is about 50 percent Torriorthents and 40 percent Rock outcrop. The two components occur as areas so intricately intermingled that mapping them separately was not practical at the scale used.

Included in mapping are areas of Badlands. Included areas make up about 10 percent of the total acreage of this unit.

Torriorthents commonly are very shallow to deep over hard or soft bedrock. These soils are well drained to somewhat excessively drained. They formed in residuum and colluvium derived from sandstone, shale, limestone, or siltstone. No single profile is typical of Torriorthents, but a common profile in the survey area has a surface layer of pale brown channery loam about 2 inches thick. The underlying material is very channery loam about 11 inches thick. Sandstone is at a depth of about 13 inches. In some areas the surface layer is stony or flaggy. Depth to shale or sandstone ranges from 4 to 60 inches. The soils are calcareous throughout.

Permeability is moderate or moderately rapid in the Torriorthents. The available water capacity is very low to moderate. The effective rooting depth is 4 to 60 inches. Runoff is very rapid, and the hazard of water erosion is very severe.

Rock outcrop consists of barren escarpments, ridge caps, and rocky points of sandstone, shale, limestone, or siltstone. The escarpments commonly are 3 to 50 feet high and 25 to 2,500 feet long.

Most areas of this unit are used as wildlife habitat or for limited livestock grazing. A few areas are used for the development of coal and natural gas.

Livestock grazing is limited because of the sparseness of vegetation, the slope, and restricted accessibility.

Plant species at the lower elevations of this unit include Salina wildrye, Indian ricegrass, bluebunch wheatgrass, forbs, shadscale saltbush, Wyoming big sagebrush, small low rabbitbrush, plains pricklypear, and prairie Junegrass and a thin overstory of Utah juniper. Plant species at the upper elevations include western wheatgrass, Salina wildrye, forbs, Wyoming big sagebrush, shadscale saltbush, Utah serviceberry, Indian ricegrass, and Gambel's oak and a thin overstory of Utah juniper. If the condition of the range deteriorates, shrubby species and trees increase. If the range condition continues to deteriorate, cheatgrass and Russian thistle invade. The potential production of the native understory vegetation in normal years is about 200 pounds of air-dry vegetation per acre.

The suitability of this unit for range seeding is low. The main limitations are droughtiness, the slope, and the Rock outcrop.

Twoneedle pinyon and Utah juniper have limited economic value. They are used as a source of firewood, fence posts, and Christmas trees. In most areas, however, the slope limits access for harvesting wood products.

Because it is mainly on south-facing slopes, which are accessible during most of the winter, this unit is used extensively as winter range and cover for mule deer and elk.

If this unit is used for development of mineral resources, the main limitations are the shallow depth to rock, the Rock outcrop, and the slope. Areas of this unit are not stable and are subject to mass movement. Wet areas and sloping rock formations should be identified prior to any construction. Access roads should be designed with an adequate cut-slope grade, and drains are needed to control surface runoff and keep soil losses to a minimum.

The capability classification of the Torriorthents is 7e, nonirrigated. The Torriorthents are in the Pinyon/Juniper ecological site.

67—Tosca channery loam, 25 to 80 percent slopes

This deep, well drained soil is on mountain side slopes and footslopes (fig. 13). It formed in colluvium derived dominantly from Green River shale. The native vegetation is mainly serviceberry, Gambel's oak, snowberry, and grasses. Elevation is 6,200 to 8,500 feet. The average annual precipitation is 16 to 20 inches, the average annual air temperature is 40 to 46 degrees F, and the average frost-free period is 85 to 110 days.

Typically, the surface layer is dark grayish brown channery loam about 8 inches thick. The next layer is brown very channery loam about 7 inches thick. The upper part of the subsoil is brown very channery loam about 9 inches thick. The lower part to a depth of 60 inches or more is very pale brown and light yellowish brown very channery loam.

Included in mapping are small areas of soils that are similar to the Tosca soil but contain fewer coarse fragments or less lime or are shallow. Also included are areas of Rock outcrop on southern exposures.

Permeability is moderate in the Tosca soil. The available water capacity is low. The effective rooting

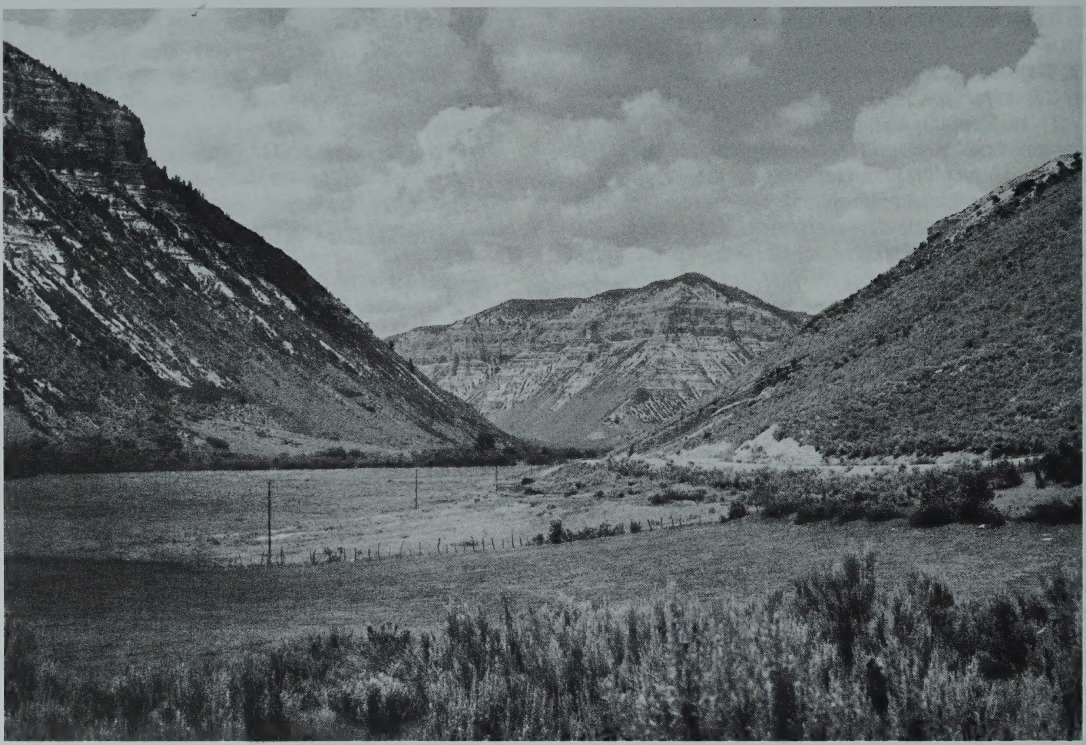

Figure 13.—Tosca channery loam, 25 to 80 percent slopes, and Happle-Rock outcrop association, 25 to 65 percent slopes, are in the sloping areas. The concave area in the middle ground is Cumulic Haploborolls, 1 to 3 percent slopes.

depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is very severe.

This unit is used for livestock grazing or as wildlife habitat.

The potential plant community is mainly Gambel's oak, Saskatoon serviceberry, mountain snowberry, slender wheatgrass, nodding brome, mountain brome, and elk sedge. The potential production of the native vegetation in normal years is about 1,800 pounds of air-dry vegetation per acre.

Mechanical treatment is not practical because the surface is stony and the slopes are too steep. The slope limits access by livestock and can result in overgrazing of the less sloping areas. Suitable management practices include proper range use, deferred grazing, and a planned grazing system.

The upper 40 inches of the Tosca soil is only a fair source of reconstruction material for drastically disturbed areas because of excess lime. Below this depth, the soil is a poor source of this material because of the lime content.

The capability classification is 7e, nonirrigated. This unit is in the Brushy Loam ecological site #238.

68—Trail loamy sand, 1 to 5 percent slopes

This deep, somewhat excessively drained soil is on flood plains and low terraces. It formed in stratified sandy alluvium derived dominantly from sandstone. The native vegetation is mainly grass and shrubs. Elevation is 4,800 to 5,800 feet. The average annual precipitation is 7 to 10 inches, the average annual air temperature is 49 to 52 degrees F, and the average frost-free period is 115 to 130 days.

Typically, the surface layer is light brownish gray loamy sand about 5 inches thick. The underlying

material to a depth of 60 inches or more is light brownish gray, stratified loamy sand.

Included in mapping are small areas of Youngston loam, Cameo fine sandy loam, and Panitchen loam. Included areas make up about 10 percent of the total acreage of this unit.

Permeability is rapid in the Trail soil. The available water capacity is low. The effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. This unit is subject to rare flooding for brief periods in the spring and summer.

This unit is used for livestock grazing.

The potential plant community is mainly alkali sacaton, inland saltgrass, western wheatgrass, and greasewood. If range condition declines as a result of overgrazing, greasewood and inland saltgrass increase. If continued deterioration is allowed, cheatgrass, mustard, and halogeton invade. The average annual production of air-dry vegetation is about 700 pounds per acre.

Range seeding is suitable if the range is in poor condition. Seeding late in fall helps to ensure establishment of seedlings the following spring when the content of moisture in the soil is more likely to be adequate. Plants that tolerate salt and droughtiness should be selected. Adapted native grasses are alkali sacaton and western wheatgrass. Introduced grasses that may be considered for pasture planting are crested wheatgrass, tall wheatgrass, and Russian wildrye. Areas that are heavily infested with undesirable plants can be improved by brush management. Suitable management practices include proper range use, deferred grazing, and a planned grazing system.

If this unit is used for development of mineral resources, the main limitations are flooding, seepage, piping, and a low water-holding capacity. Roads and streets should be located above the expected flood level.

The Trail soil is only a fair source of reconstruction material for drastically disturbed areas because of the limited available water capacity, excess lime, and the sandy textures.

The capability classification is 7s, nonirrigated. This unit is in the Salt Flats ecological site #262.

69—Travessilla-Rock outcrop complex, 10 to 35 percent slopes

This map unit is on dissected mesas. The native vegetation is mainly Utah juniper, twoneedle pinyon, scattered sagebrush, and grasses. Elevation is 5,400 to 6,800 feet. The average annual precipitation is 12 to 16 inches, the average annual air temperature is 46 to 52 degrees F, and the average frost-free period is 100 to 150 days.

This unit is about 45 percent Travessilla fine sandy loam and 40 percent Rock outcrop. The two components occur as areas so intricately intermingled that mapping them separately was not practical at the scale used.

Included in mapping are small areas of soils that are similar to the Travessilla soil but formed in shale; soils that are moderately deep over sandstone and contain as much as 35 percent coarse fragments; soils that are finer textured and more developed than the Travessilla soil; and cooler soils on north slopes. Also included are small areas of Barx loam and Bunkwater very fine sandy loam. Included areas make up about 15 percent of the total acreage of this unit.

The Travessilla soil is shallow and very shallow and is well drained. It formed in residuum derived dominantly from sandstone. Typically, the surface layer is brown fine sandy loam about 2 inches thick. The underlying material is yellowish brown fine sandy loam about 7 inches thick. Sandstone is at a depth of about 9 inches.

Permeability is moderately rapid in the Travessilla soil. The available water capacity is very low. The effective rooting depth is 4 to 20 inches. Runoff is rapid, and the hazard of water erosion is very severe.

Rock outcrop occurs as rounded sandstone knolls and ledges throughout the unit.

This unit is used for livestock grazing, wood production, or wildlife habitat.

The potential plant community on the Travessilla soil is mainly Utah juniper and an understory of needleandthread, bottlebrush squirreltail, bluebunch wheatgrass, Sandberg bluegrass, and galleta. If range condition declines as a result of overgrazing, the proportion of forbs, shrubs, and juniper increases. The potential production of the native understory vegetation in normal years is about 300 pounds of air-dry vegetation per acre. The main limitations affecting seeding are the Rock outcrop and the slope.

The Travessilla soil is suited to the production of juniper and twoneedle pinyon. The site index for twoneedle pinyon and juniper ranges from 35 to 45. Based on a site index of 40 for juniper, this soil can produce less than 3.3 cubic feet of wood per acre per year. The main concerns affecting the production and harvesting of timber are the shallow depth to hard rock, the restricted water-holding capacity, and the rapid runoff rate. The slope increases the difficulty of harvesting. Some firewood, posts, and Christmas trees can be produced in areas of this unit.

The Travessilla soil is only a fair source of reconstruction material for drastically disturbed areas because of excess lime.

The capability classification of this unit is 7e, nonirrigated. The Travessilla soil is in the Foothill Juniper ecological site #447.

70—Uffens loam, 1 to 8 percent slopes

This deep, well drained, strongly alkaline soil is on mesas and terraces. It formed in alluvium derived from mixed materials. The native vegetation is mainly grass and shrubs. Elevation is 4,800 to 5,100 feet. The average annual precipitation is 7 to 10 inches, the average annual air temperature is 52 to 56 degrees F, and the average frost-free period is 160 to 175 days.

Typically, the surface layer is very pale brown loam about 5 inches thick. The subsoil is pale brown loam about 22 inches thick. The substratum to depth of 60 inches or more is pale brown sandy loam.

Included in mapping are small areas of strongly alkaline slickspots and areas of Avalon loam. Included areas make up about 15 percent of the total acreage of this unit.

Permeability is moderately slow in the Uffens soil. The available water capacity is moderate. The effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate to very severe.

This unit is used mainly for livestock grazing or as wildlife habitat.

The potential plant community is mainly alkali sacaton, inland saltgrass, western wheatgrass, fourwing saltbush, and greasewood. The average annual production of air-dry vegetation is about 700 pounds per acre. If range condition declines as a result of overgrazing, greasewood, inland saltgrass, and tall rabbitbrush increase. If continued deterioration is allowed, cheatgrass, Russian thistle, kochia, halogeton, and pepperweed invade. Brush management can improve deteriorated areas of range that are producing more woody shrubs than were present in the potential plant community.

The suitability of this unit for range seeding is poor. The main limitations are the low precipitation and the limited available water capacity, which is caused by high alkalinity. Plants that tolerate salt and droughtiness should be selected. Native species that are suitable for seeding include alkali sacaton, western wheatgrass, and fourwing saltbush. Introduced species that can be used include tall wheatgrass, crested wheatgrass, and Russian wildrye. The plants selected for seeding should meet the seasonal requirements of livestock, wildlife, or both. Seeding late in fall helps to ensure establishment of seedlings the following spring when the content of moisture in the soil is more likely to be adequate. Loss of the surface layer severely limits productivity and the potential of the unit to produce plants suitable for grazing.

The Uffens soil is a poor source of reconstruction material for drastically disturbed areas because of excess sodium.

The capability classification is 7s, nonirrigated. This unit is in the Salt Flats ecological site #262.

71—Utso-Rock outcrop complex, 40 to 90 percent slopes

This map unit is on side slopes. The native vegetation is mainly Rocky Mountain Douglas-fir, shrubs, and scattered grasses. Elevation is 6,800 to 8,000 feet. The average annual precipitation is 15 to 20 inches, the average annual air temperature is 43 to 46 degrees F, and the average frost-free period is 85 to 110 days.

This unit is about 60 percent Utso channery loam and 25 percent Rock outcrop. The two components occur as areas so intricately intermingled that mapping them separately was not practical at the scale used.

Included in mapping are small areas of soils that are similar to the Utso soil but do not have a dark surface horizon or soils that have an accumulation of clay in the substratum. Also included are small areas of shallow soils and areas of Tosca channery loam. The extent of the included areas varies from one delineation to another.

The Utso soil is deep and well drained. It formed in colluvium derived dominantly from the Green River shale formation. Typically, the surface layer is very dark grayish brown channery loam about 4 inches thick. The next layer is dark grayish brown very channery loam about 7 inches thick. The subsoil to a depth of 60 inches or more is grayish brown very channery loam.

Permeability is moderate in the Utso soil. The available water capacity is low. The effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is very severe.

Rock outcrop occurs as horizontal bands 10 to 50 feet high along canyon rims and as buttresses extending into areas of the Utso soil. The buttresses make up about 5 percent of the Rock outcrop.

This unit is used for livestock grazing, wood products, or wildlife habitat.

The potential plant community is mainly Rocky Mountain Douglas-fir and an understory of mountain brome, nodding brome, kinnikinnick, elk sedge, and

mountain snowberry. The potential production of the native understory vegetation in normal years is about 500 pounds of air-dry vegetation per acre.

The Utso soil is suited to the production of softwood products. The site index for Rocky Mountain Douglas-fir ranges from 50 to 70. Based on a site index of 61 for Rocky Mountain Douglas-fir, this soil can produce 47 cubic feet of wood per acre per year. The main concerns affecting the production and harvesting of timber are the slope, the content of coarse fragments, the low available water capacity, and the low precipitation. The use of conventional harvesting methods is limited because of the slope. The Rock outcrop also interferes with harvesting of timber.

The Utso soil is a good source of reconstruction material for drastically disturbed areas.

The capability classification of the Utso soil is 7e, nonirrigated. The Utso soil is in the Rocky Mountain Douglas-Fir ecological site.

72—Wesdy stony loam, 9 to 25 percent slopes, very bouldery

This deep, well drained soil is on footslopes. It formed in mixed colluvium and glacial outwash derived dominantly from basaltic rock sources. Slopes are 9 to 25 percent. Elevation is 8,000 to 8,500 feet. The native vegetation is mainly quaking aspen and an understory of large shrubs and grasses. The average annual precipitation is 25 to 28 inches, the average annual air temperature is 37 to 39 degrees F, and the average frost-free period is less than 75 days.

About 1 to 3 percent of the surface is covered with boulders and stones. Typically, the surface layer is very dark gray stony loam about 15 inches thick. The subsoil to a depth of 60 inches or more is brown very cobbly clay.

Included in mapping are small areas of Godding stony loam and Fughes stony loam, small areas of Hesperus loam in swales, and small areas of Northwater loam on the steeper slopes. Also included are small areas of somewhat poorly drained and poorly drained soils bordering small ponds. Included areas make up about 30 percent of the total acreage of this unit. The percentage varies from one mapped area to another.

Permeability is slow in the Wesdy soil. The available water capacity is moderate. The effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is severe or very severe. The stones and boulders on the surface are spaced about 20 to 100 feet apart.

This unit is used as summer range for livestock or as habitat for wildlife. The unit can be used for production of quaking aspen firewood and as summer homesites if special precautions are taken.

The potential plant community is mainly quaking aspen and an understory of Saskatoon serviceberry, mountain snowberry, nodding brome, Letterman's needlegrass, Columbia needlegrass, blue wildrye, and many forbs. The potential production of the native understory vegetation in normal years is about 2,500 pounds of air-dry vegetation per acre. The main limitations affecting seeding are the stones on the surface.

This unit is suited to the production of wood products. The site index for quaking aspen ranges from 55 to 65. Based on a site index of 59 for quaking aspen, this soil can produce 31 cubic feet of wood per acre per year. The main concerns affecting the production and harvesting of timber are the stony surface layer, the content of coarse fragments, and the slope. The stones on the surface can interfere with felling, yarding, and other activities involving the use of equipment.

This unit is poorly suited to homesite development. The main limitations are the slope, slippage, the shrink-swell potential, large stones, and the restricted permeability. The design of access roads should control surface runoff and help to stabilize cut slopes. The effects of shrinking and swelling can be minimized by using proper engineering designs and by backfilling with material that has a low shrink-swell potential. The slope is a concern affecting the installation of septic tank absorption fields. Absorption lines should be installed on the contour. Effluent from septic tank absorption fields can surface in downslope areas and thus create a hazard to health. If this soil is used as a site for septic tank absorption fields, the restricted permeability can be overcome by enlarging the absorption field.

The capability classification is 7e, nonirrigated. This unit is in the Quaking Aspen ecological site.

73—Wesdy-Northwater complex, 25 to 65 percent slopes, very bouldery

This map unit is on mountain side slopes. The native vegetation is mainly quaking aspen and scattered Engelmann's spruce and subalpine fir and an understory of shrubs, forbs, and grasses. Elevation is 8,200 to 9,600 feet. The average annual precipitation is 25 to 30 inches, the average annual air temperature is 35 to 39 degrees F, and the average frost-free period is less than 75 days.

This unit is about 45 percent Wesdy soil and 40

percent Northwater soil. The two soils occur as areas so intricately intermingled that mapping them separately was not practical at the scale used.

Included in mapping are small areas of Rubble land and soils that are shallow over shale. Included areas make up about 15 percent of the total acreage of this unit.

The Wesdy soil is deep and well drained. It formed in colluvium and glacial material derived dominantly from mixed sources. About 1 to 3 percent of the surface is covered with boulders and stones. Typically, the surface layer is very dark gray stony loam about 15 inches thick. The subsoil to a depth of 60 inches or more is brown very cobbly clay.

Permeability is slow in the Wesdy soil. The available water capacity is moderate. The effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is severe or very severe. The stones and boulders on the surface are spaced about 20 to 100 feet apart.

The Northwater soil is deep and well drained. It formed in colluvium derived dominantly from sedimentary rocks and modified with basalt colluvium. Typically, the surface layer is dark grayish brown loam about 28 inches thick. The subsoil is yellowish brown very channery loam about 20 inches thick. The substratum to a depth of 60 inches or more is yellowish brown extremely channery loam.

Permeability is moderate in the Northwater soil. The available water capacity also is moderate. The effective rooting depth is 60 inches or more. Runoff is medium or rapid, and the hazard of water erosion is very severe. Stones and boulders on the surface are spaced about 40 to 100 feet apart.

This unit is used mainly for livestock grazing or as wildlife habitat. It is also used as municipal watershed.

The potential plant community is mainly quaking aspen and an understory of Saskatoon serviceberry, mountain snowberry, mountain brome, Columbia needlegrass, blue wildrye, and a variety of forbs. The potential production of the native understory vegetation in normal years is about 2,500 pounds of air-dry vegetation per acre on the Wesdy soil and 2,800 pounds per acre on the Northwater soil. Because of the stones on the surface, seeding grass is not practical in areas of this unit.

This unit is moderately well suited to quaking aspen. The site index for quaking aspen ranges from 50 to 70. Based on a site index of 60 for quaking aspen, this unit can produce 32 cubic feet of wood per acre per year. The stones on the surface can interfere with felling, yarding, and other activities involving the use of equipment. The main concerns affecting the production and harvesting of timber are the slope, the boulders on the surface, excessive runoff, and the very severe hazard of erosion.

The capability classification of this unit is 7e, nonirrigated. The unit is in the Quaking Aspen ecological site.

74—Winnemucca-Castino loams, 1 to 10 percent slopes, stony

This map unit is on Grand Mesa. The native vegetation is mainly sagebrush, grass, and forbs. Elevation is 9,900 to 10,000 feet. The average annual precipitation is 25 to 30 inches, the average annual air temperature is 36 to 40 degrees F, and the average frost-free period is 50 to 65 days.

This unit is about 60 percent Winnemucca soil and 30 percent Castino soil. The two soils occur as areas so intricately intermingled that mapping them separately was not practical at the scale used.

Included in mapping are small areas of Skisams loam and soils that are similar to the major soils but contain fewer coarse fragments. Included areas make up about 10 percent of the total acreage of this unit.

The Winnemucca soil is deep and moderately well drained. It formed in mixed eolian material over residuum derived from basalt. Typically, about 0.1 percent of the surface is covered with stones. The surface layer is dark grayish brown loam about 19 inches thick. The upper part of the subsoil is light yellowish brown cobbly clay loam about 9 inches thick. The lower part is brown very cobbly clay about 22 inches thick. The substratum to a depth of 60 inches or more is brown clay.

Permeability is slow in the Winnemucca soil. The available water capacity is moderate. The effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of water erosion is moderate. Water perches on top of the subsoil during the spring and early summer.

The Castino soil is moderately deep and is well drained. It formed in mixed eolian material over residuum derived from basalt. Typically, about 0.1 percent of the surface is covered with stones. The surface layer is dark brown loam about 16 inches thick. The upper part of the subsoil is yellowish brown cobbly clay loam about 5 inches thick. The next part of the subsoil is brown very cobbly clay loam about 8 inches thick. The lower part of the subsoil is very cobbly clay about 9 inches thick. Basalt is at a depth of about 38 inches.

Permeability is slow in the Castino soil. The available water capacity is low. The effective rooting depth is 20 to 40 inches. Runoff is medium, and the hazard of water erosion is moderate. Water perches

on top of the subsoil during the spring and early summer.

This unit is used for livestock grazing, wildlife habitat, or recreational purposes.

The potential plant community is mainly nodding brome, sheep fescue, red fescue, slender wheatgrass, and tufted hairgrass. If range condition declines as a result of overgrazing, sheep fescue, several forbs, and shrubby cinquefoil increase. If continued deterioration is allowed, houndstongue, prostrate knotweed, and rabbitbrush will invade. The average annual production of air-dry vegetation is about 2,300 pounds per acre. Livestock grazing should be managed so that the desired balance of preferred species is maintained in the plant community. Since seeding is limited because of the cold temperatures, proper management is needed to maintain the desirable vegetation and production.

The soils in this unit are a poor source of reconstruction material for drastically disturbed areas because of the large stones and a high content of clay.

The capability classification of this unit is 6e, nonirrigated. The unit is in the Wet Subalpine ecological site #253.

75—Wrayha-Rabbitex-Veatch complex, 45 to 65 percent slopes, very stony

This map unit is on canyon side slopes. It formed in deeply truncated residuum and localized colluvium derived dominantly from marine shales and sandstones. About 1 to 3 percent of the surface is covered with stones that are spaced 10 to 30 feet apart. Slope varies, depending in part on the local thicknesses and sequences of hard sandstone and the softer or less stable shale. Individual areas of this unit are irregularly elongated and range from 100 to 500 acres in size. The native vegetation is mainly shrubs and perennial grasses. Elevation is 5,800 to 7,600 feet. The average annual precipitation is 14 to 16 inches, the average annual air temperature is 40 to 45 degrees F, and the average frost-free period is 85 to 105 days.

This unit is about 35 percent Wrayha soil, 20 percent Rabbitex soil, and 20 percent Veatch soil. The proportion of the Wrayha soil is higher in areas of geologic instability. The three soils occur as areas so intricately intermingled that mapping them separately was not practical at the scale used.

Included in mapping are small areas of Rentsac channery loam and Rock outcrop and small areas of soils that are less than 40 inches deep over slightly weathered shale or sandstone. Also included are small areas that have slopes of less than 45 percent or more than 65 percent. The less sloping areas generally are on narrow ridge crests. Included areas make up about 25 percent of the total acreage of this unit. The percentage varies from one mapped area to another.

The Wrayha soil is deep and well drained. It formed in residuum derived dominantly from marine shales. Typically, the surface layer is grayish brown gravelly sandy loam about 4 inches thick. The upper part of the underlying material is pale olive clay loam about 24 inches thick. The next part is reddish gray silty clay loam about 21 inches thick. The lower part of the underlying material to a depth of 60 inches or more is grayish brown silty clay loam.

Permeability is slow in the Wrayha soil. The available water capacity is moderate. The effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is very severe.

The Rabbitex soil is deep and well drained. It formed in residuum and colluvium derived dominantly from siltstones and fine grained sandstone. Typically, the surface layer is brown loam about 7 inches thick. The upper part of the subsoil is light gray loam about 8 inches thick. The lower part to a depth of 60 inches or more is light gray channery loam.

Permeability is moderate in the Rabbitex soil. The available water capacity is high. The effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is very severe.

The Veatch soil is moderately deep and is well drained. It formed in residuum and colluvium derived dominantly from marine sandstones, siltstones, and shales. Typically, the surface layer is dark grayish brown loam about 6 inches thick. The upper part of the subsoil also is dark grayish brown loam. It is about 5 inches thick. Below this is 21 inches of pale brown very channery sandy loam. Sandstone is at a depth of about 32 inches.

Permeability is moderate in the Veatch soil. The available water capacity is low. The effective rooting depth is 20 to 40 inches. Runoff is medium, and the hazard of water erosion is very severe.

This unit is used for livestock grazing or as habitat for wildlife.

The potential plant community is mainly twoneedle pinyon and Gambel's oak and an understory of western wheatgrass, bluebunch wheatgrass, prairie Junegrass, elk sedge, and muttongrass. The potential production of the native understory vegetation in normal years is about 550 pounds per acre on the Wrayha and Rabbitex soils and 500 pounds per acre on the Veatch soil. Grazing by domestic livestock is limited by the slope.

The Wrayha soil is suited to the production of firewood. The site index for twoneedle pinyon and juniper ranges from 65 to 85. Based on a site index of 75 for twoneedle pinyon and juniper, this soil can produce 8.5 cubic feet of wood per acre per year. The main concerns affecting the production and harvesting of timber are the slope, the clayey texture, the restricted permeability, and excessive runoff.

The Rabbitex soil is suited to the production of firewood. The site index for twoneedle pinyon and juniper ranges from 50 to 70. Based on a site index of 60 for twoneedle pinyon and juniper, this soil can produce 6.1 cubic feet of wood per acre per year. The main concerns affecting the production and harvesting of timber are the complex, steep slopes and excessive runoff.

The Veatch soil is moderately well suited to the production of firewood. The site index for twoneedle pinyon and juniper ranges from 60 to 80. Based on a site index of 70 for twoneedle pinyon and juniper, this soil can produce 7.8 cubic feet of wood per acre per year. The main concerns affecting the production and harvesting of timber are the slope, the content of coarse fragments, the limited rooting depth, droughtiness, and excessive runoff. Specialized methods of harvesting timber are needed because of the slope.

If this unit is used for development of mineral resources, the main limitations are the slope and the susceptibility to mass movement.

The soils in this unit are only a fair source of reconstruction material for drastically disturbed areas. Limitations include a high content of clay and excess lime in areas of the Wrayha soil, excess lime in areas of the Rabbitex soil, and excess lime and large stones in areas of the Veatch soil.

The capability classification of this unit is 7e, nonirrigated. The unit is in the Mountain Pinyon ecological site #448.

76—Wrayha-Veatch-Rabbitex complex, 12 to 45 percent slopes

This map unit is on side slopes of mountains and ridges. The native vegetation is mainly twoneedle pinyon, juniper, serviceberry, Gambel's oak, and cool-season grasses. Elevation is 5,800 to 7,500 feet. The average annual precipitation is 14 to 16 inches, the average annual air temperature is 40 to 45 degrees F, and the average frost-free period is 85 to 105 days.

This unit is about 45 percent Wrayha gravelly sand loam, 25 percent Veatch loam, and 20 percent Rabbitex loam. The three soils occur as areas so intricately intermingled that mapping them separately was not practical at the scale used.

Included in mapping are small areas of Yamo loam, Shawa loam, and Rock outcrop.

The Wrayha soil is deep and well drained. It formed in residuum derived dominantly from the Wasatch shale formation. Typically, the surface layer is brown gravelly sandy loam about 4 inches thick. The upper part of the underlying material is pale olive clay loam about 24 inches thick. The next part is reddish gray silty clay loam about 21 inches thick. The lower part of the underlying material to a depth of 60 inches or more is grayish brown silty clay loam.

Permeability is slow in the Wrayha soil. The available water capacity is high. The effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is very severe.

The Veatch soil is moderately deep and is well drained. It formed in residuum and colluvium derived dominantly from siltstone and sandstone of the Wasatch Formation. Typically, the surface layer is dark grayish brown loam about 6 inches thick. The upper part of the subsoil also is dark grayish brown loam. It is about 5 inches thick. Below this is 21 inches of pale brown very channery sandy loam. Sandstone is at a depth of about 32 inches.

Permeability is moderate in the Veatch soil. The available water capacity is low. The effective rooting depth is 20 to 40 inches. Runoff is medium, and the hazard of water erosion is very severe.

The Rabbitex soil is deep and well drained. It formed in residuum and colluvium derived dominantly from siltstone and sandstone of the Wasatch Formation. Typically, the surface layer is brown loam about 7 inches thick. The upper part of the subsoil is light gray loam about 8 inches thick. The lower part to a depth of 60 inches or more is light gray channery loam.

Permeability is moderate in the Rabbitex soil. The available water capacity also is moderate. The effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is very severe.

This unit is used for livestock grazing or as wildlife habitat.

The understory plant community is mainly western wheatgrass, bluebunch wheatgrass, prairie Junegrass, elk sedge, muttongrass, Gambel's oak, and twoneedle pinyon. If overgrazing is allowed, the extent of grasses decreases and shrubs and trees become more dominant. The average annual production of air-dry vegetation is about 550 pounds per acre on the Wrayha and Rabbitex soils and 500 pounds per acre on the Veatch soil. Suitable

management practices include proper range use, deferred grazing, and a planned grazing system.

The Wrayha soil is suited to the production of firewood. The site index for twoneedle pinyon and juniper ranges from 65 to 85. Based on a site index of 75 for twoneedle pinyon and juniper, this soil can produce 8.5 cubic feet of wood per acre per year. The main concerns affecting the production and harvesting of timber are the slope, the clayey texture, the restricted permeability, and excessive runoff.

The Veatch soil is moderately well suited to the production of firewood. The site index for twoneedle pinyon and juniper ranges from 60 to 80. Based on a site index of 70 for twoneedle pinyon and juniper, this soil can produce 7.8 cubic feet of wood per acre per year. The main concerns affecting the production and harvesting of timber are the slope, the content of coarse fragments, the limited rooting depth, and droughtiness.

The Rabbitex soil is suited to the production of firewood. The site index for twoneedle pinyon and juniper ranges from 50 to 70. Based on a site index of 60 for twoneedle pinyon and juniper, this soil can produce 6.1 cubic feet of wood per year. The main concerns affecting the production and harvesting of timber are the slope, droughtiness, and excessive runoff.

The soils in this unit are only a fair source of reconstruction material for drastically disturbed areas. Limitations include excess lime and a high content of clay in areas of the Wrayha soil, excess lime and large stones in areas of the Veatch soil, and excess lime in areas of the Rabbitex soil.

The capability classification of this unit is 7e, nonirrigated. The unit is in the Mountain Pinyon ecological site #448.

77—Yamo, moist-Redcreek complex, 3 to 25 percent slopes

This map unit is on mountain side slopes and ridgetops. The native vegetation is mainly sagebrush, grasses, twoneedle pinyon, and juniper. Elevation is 6,300 to 7,100 feet. The average annual precipitation is 12 to 15 inches, the average annual air temperature is 40 to 45 degrees F, and the average frost-free period is 85 to 105 days.

This unit is about 55 percent Yamo soil and 35 percent Redcreek soil. The two soils occur as areas so intricately intermingled that mapping them separately was not practical at the scale used.

Included in mapping are small areas of soils that are similar to the major soils but are 20 to 40 inches deep to bedrock or have less clay and are less well developed. Also included are areas of Rock outcrop.

The Yamo soil is deep and well drained. It formed in residuum derived dominantly from mixed sources. Typically, the surface layer is brown sandy clay loam about 5 inches thick. The upper part of the subsoil is pale brown sandy clay loam about 11 inches thick. The next part also is pale brown sandy clay loam. It is about 24 inches thick. The lower part of the subsoil to a depth of 60 inches or more is pale brown sandy loam.

Permeability is moderate in the Yamo soil. The available water capacity is high. The effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is severe.

The Redcreek soil is shallow and well drained. It formed in residuum derived dominantly from calcareous sandstone. Typically, the surface layer is brown sandy loam about 4 inches thick. The upper part of the underlying material also is brown sandy loam. It is about 7 inches thick. The lower part of the underlying material is very pale brown channery sandy loam about 5 inches thick. Sandstone is at a depth of about 16 inches.

Permeability is moderately rapid in the Redcreek soil. The available water capacity is very low. The effective rooting depth is 10 to 20 inches. Runoff is medium or rapid, and the hazard of water erosion is severe or very severe.

This unit is used for livestock grazing.

The potential plant community on the Yamo soil is needleandthread, western wheatgrass, muttongrass, and mountain big sagebrush. Twoneedle pinyon and Utah juniper stands are invading areas of this soil. If overgrazing and overstory competition are allowed, grasses and forbs decrease and twoneedle pinyon and Utah juniper increase. The potential production of the native vegetation in normal years is about 1,500 pounds of air-dry vegetation per acre.

Range seeding is suitable on the Yamo soil if the range is in poor condition. Seeding late in fall helps to ensure establishment of seedlings the following spring when the content of moisture in the soil is more likely to be adequate. Adapted native grasses are needleandthread, western wheatgrass, and muttongrass. Introduced grasses that may be considered in a seed mixture for pasture planting are intermediate wheatgrass, crested wheatgrass, and smooth brome. The plants selected for seeding should meet the seasonal requirements of livestock, wildlife, or both. Brush management can improve areas that are being dominated by shrubs, juniper, and twoneedle pinyon. Mechanical, chemical, biological, and ecological methods of brush control may be used.

The potential plant community on the Redcreek soil is mainly twoneedle pinyon and an understory of prairie Junegrass, western wheatgrass, muttongrass, and Gambel's oak. If the condition of the understory deteriorates, the proportion of forbs, shrubs, and twoneedle pinyon increases. The average understory production of air-dry vegetation is about 500 pounds per acre.

Management practices suitable for use on this unit include proper range use, deferred grazing, and a planned grazing system.

The Redcreek soil is suited to the production of firewood and posts. The site index for twoneedle pinyon and juniper ranges from 95 to 115. Based on a site index of 105 for twoneedle pinyon and juniper, this soil can produce 16 cubic feet of wood per acre per year. The main concerns affecting the production and harvesting of timber are the limited rooting depth and droughtiness. Minimizing the removal of organic litter from the surface helps to maintain a high rate of water infiltration, reduces the runoff rate, and helps to maintain an adequate source of nutrients for trees. Seeding grasses after twoneedle pinyon and juniper have been harvested helps to control erosion. Deferring grazing in harvested areas for at least 2 years helps to ensure the development of sufficient plant cover to protect the soil from erosion.

The Yamo and Redcreek soils are a good source of reconstruction material for drastically disturbed areas.

The capability classification of this unit is 6e, nonirrigated. The Yamo soil is in the Deep Loam ecological site #292, and the Redcreek soil is in the Mountain Pinyon ecological site #448.

78—Youngston loam, 1 to 6 percent slopes

This deep, well drained soil is on alluvial fans, valley bottoms, low terraces, and flood plains. It formed in calcareous, stratified alluvium derived dominantly from sedimentary rock. The native vegetation is mainly shrubs and grass. Elevation is 4,800 to 5,400 feet. The average annual precipitation is 6 to 10 inches, the average annual air temperature is 46 to 52 degrees F, and the average frost-free period is 160 to 175 days.

Typically, the surface layer is light brownish gray loam about 4 inches thick. The upper part of the underlying material is pale brown loam about 10 inches thick. The lower part to a depth of 60 inches or more is stratified loam.

Included in mapping are small areas of Billings silty clay loam and Trail loamy sand. Included areas make up about 10 percent of the total acreage of this unit.

Permeability is moderately slow in the Youngston soil. The available water capacity is high. The effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion ranges from slight on the lower slopes to severe in the steeper areas. The lower part of the soil is moderately saline.

This unit is used for livestock grazing or as wildlife habitat.

The potential plant community is mainly galleta, Indian ricegrass, fourwing saltbush, and shadscale saltbush. If range condition declines as a result of overgrazing, Gardner's saltbush, yellow rabbitbrush, broom snakeweed, and plains pricklypear increase. If continued deterioration is allowed, cheatgrass, halogeton, Russian thistle, and annual mustard invade. The average annual production of air-dry vegetation is about 600 pounds per acre.

Range seeding is suitable if the range is in poor condition. Suitable seeding mixtures include galleta and Indian ricegrass. Crested wheatgrass can be used for pasture planting. The plants selected for seeding should meet the seasonal requirements of livestock, wildlife, or both. Seeding late in fall helps to ensure establishment of seedlings the following spring when the content of moisture in the soil is more likely to be adequate. Suitable management practices include proper range use, deferred grazing, and a planned grazing system.

The Youngston soil is a fair or poor source of reconstruction material for drastically disturbed areas because of excess lime.

The capability classification is 3e, irrigated, and 6e, nonirrigated. This unit is in the Loamy Saltdesert ecological site #401.

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help to prevent soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavioral characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as rangeland and woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreational facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Interpretive Ratings

The interpretive tables in this survey rate the soils in the survey area for various uses. Many of the tables identify the limitations that affect specified uses and indicate the severity of those limitations. The ratings in these tables are both verbal and numerical.

Rating Class Terms

Rating classes are expressed in the tables in terms that indicate the extent to which the soils are limited by all of the soil features that affect a specified use. Terms for limitation classes are *not limited, somewhat limited,* and *very limited.*

Numerical Ratings

Numerical ratings in the tables indicate the relative severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.00 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use and the point at which the soil feature is not a limitation. The limitations appear in order from the most limiting to the least limiting. Thus, if more than one limitation is identified, the most severe limitation is listed first and the least severe one is listed last.

Crops and Pasture

Emery Johnson, district conservationist, Natural Resources Conservation Service, helped prepare this section.

General management needed for crops and pasture is suggested in this section. The system of land capability classification used by the Natural Resources Conservation Service is explained, the estimated yields of the main crops and pasture plants are listed, and prime farmland is described.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under the heading "Detailed Soil Map Units." Specific information can be obtained from the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.

About 30,000 acres, or approximately 3 percent of the survey area, is used for crop production. Most of this acreage is used for the production of irrigated hay and pasture. Some small grain, mainly oats, is grown in areas irrigated by sprinkler methods.

Many of the soils used for production of crops and pasture occur along major streams. Most of these

soils are on terraces, mesas, alluvial fans, and foothills. They are subject to periodic flooding, especially in the spring when the rate of runoff from snowmelt is high. The survey area is characterized by diverse topography and soils. Annual precipitation ranges from 25 inches at the highest elevation to 9 inches in the lower areas.

The main concerns affecting the management of the soils for crops and pasture are maintaining or improving productivity and controlling erosion. Except during periods when new seedlings are being established, erosion is not a major concern in areas of irrigated pasture and hay. The density of vegetation and the limited area of bare soil minimize the hazard of water erosion. Of greater concern are erosion and seepage loss from the many earthen irrigation canals and ditches. The proper application of irrigation water is an important factor in achieving good production.

In areas of some soils, such as Battlement, Dominguez, and Cameo soils, leveling can permit a more uniform application of irrigation water. Other soils, such as Fughes, Peninsula, and Happle soils, are better suited to sprinkler irrigation because of the rate of water infiltration, the slope, and/or the uneven terrain. Some soils, such as Aga soils, may not be suitable for leveling because they have sand and gravel in the soil profile. The use of sprinkler irrigation in recent years has improved crop and pasture production. Most of these sprinklers use gravity pressure and, therefore, operate without the use of pumps.

The survey area could benefit from the improvement of irrigation systems. Most irrigation water is diverted from the streams and delivered to the fields through a system of earthen ditches. Irrigation and productivity could be greatly improved by replacing the ditches with underground pipelines and improved distribution systems.

Natural soil fertility is not high enough for good crop and pasture production. Fertilizers containing nitrogen and phosphorus are needed to maintain soil fertility on all irrigated soils. For all crops, applications of fertilizer should be based on the results of soil tests. The requirements of the crops should also be considered.

Crops for which the soil and climate of the survey area are suited include barley, wheat, oats, pasture grasses, and alfalfa. Most of the soils are used for hay and pasture because of the small size and irregular shape of the fields. The short growing season in much of the survey area also limits the kind of crops that can be grown. Irrigated pastures consist of a mixture of grasses, such as smooth bromegrass and orchardgrass. For hay production, alfalfa or a mixture of grass and alfalfa is advisable. Suitable management practices for areas of irrigated pasture include delaying spring grazing until the plants have achieved a sufficient amount of new growth. Grazing should also be concluded early enough in the fall to allow the plants to regrow before a killing frost. In areas of cropland, incorporating plant residue into the soil improves soil tilth and structure. Reduced tillage and no-till farming practices can maintain or improve crop production.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, for forestland, or for engineering purposes.

In the capability system, soils are generally grouped at three levels—capability class, subclass, and unit (USDA, 1961). Only class and subclass are used in this survey.

Capability classes, the broadest groups, are designated by the numbers 1 through 8. The numbers indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class 1 soils have slight limitations that restrict their use.

Class 2 soils have moderate limitations that restrict the choice of plants or that require moderate conservation practices.

Class 3 soils have severe limitations that restrict the choice of plants or that require special conservation practices, or both.

Class 4 soils have very severe limitations that restrict the choice of plants or that require very careful management, or both.

Class 5 soils are subject to little or no erosion but have other limitations, impractical to remove, that restrict their use mainly to pasture, rangeland, forestland, or wildlife habitat.

Class 6 soils have severe limitations that make them generally unsuitable for cultivation and that restrict their use mainly to pasture, rangeland, forestland, or wildlife habitat.

Class 7 soils have very severe limitations that make them unsuitable for cultivation and that restrict their use mainly to grazing, forestland, or wildlife habitat.

Class 8 soils and miscellaneous areas have limitations that preclude commercial plant production and that restrict their use to recreational purposes, wildlife habitat, watershed, or esthetic purposes.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e, w, s,* or *c,* to the class numeral, for example, 2e. The letter *e* shows that the main hazard is the risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c,* used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

In class 1 there are no subclasses because the soils of this class have few limitations. Class 5 contains only the subclasses indicated by *w, s,* or *c* because the soils in class 5 are subject to little or no erosion. They have other limitations that restrict their use to pasture, rangeland, forestland, wildlife habitat, or recreation.

The capability classification of map units in this survey area is given in the section "Detailed Soil Map Units" and in the yields table.

Yields per Acre

The average yields per acre that can be expected of the principal irrigated crops under a high level of management are shown in table 5. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors. The land capability classification of map units in the survey area also is shown in the table.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations also are considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green manure crops; and harvesting that ensures the smallest possible loss.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 5 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Natural Resources Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Prime Farmland

Prime farmland is one of several kinds of important farmland defined by the U.S. Department of Agriculture. It is of major importance in meeting the Nation's short- and long-range needs for food and fiber. Because the supply of high-quality farmland is limited, the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, should encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland, as defined by the U.S. Department of Agriculture, is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. It could be cultivated land, pastureland, forestland, or other land, but it is not urban or built-up land or water areas. The soil qualities, growing season, and moisture supply are those needed for the soil to economically produce sustained high yields of crops when proper management, including water management, and acceptable farming methods are applied. In general, prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, an acceptable salt and sodium content, and few or no rocks. It is permeable to water and air. It is not excessively erodible or saturated with water for long periods, and it either is not frequently flooded during the growing season or is protected from flooding. Slope ranges mainly from 0 to 6 percent. More detailed information about the criteria for prime farmland is available at the local office of the Natural Resources Conservation Service.

About 57,475 acres, or nearly 6 percent of the survey area, would meet the requirements for prime farmland if an adequate and dependable supply of irrigation water were available.

A recent trend in land use in some parts of the survey area has been the loss of some prime farmland to industrial and urban uses. The loss of prime farmland to other uses puts pressure on marginal lands, which generally are more erodible, droughty, and less productive and cannot be easily cultivated.

The map units in the survey area that are considered prime farmland are listed in table 6. This list does not constitute a recommendation for a particular land use. On some soils included in the list, measures that overcome a hazard or limitation, such as flooding, wetness, and droughtiness, are needed. Onsite evaluation is needed to determine whether or not the hazard or limitation has been overcome by corrective measures. The extent of each listed map unit is shown in table 4. The location is shown on the detailed soil maps. The soil qualities that affect use and management are described under the heading "Detailed Soil Map Units."

Table 5.--Land Capability and Yields per Acre of Crops and Pasture

(Yields are those that can be expected under a high level of management. They are for irrigated areas. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil.)

Map symbol and soil name	Land capability	Alfalfa hay	Grass hay	Oats	Pasture
		Tons	Tons	Bu	AUM*
1. Aga					
2. Badland					
3. Barx					
4. Barx-Clapper					
5. Battlement	4e	3.5	2.5	70	6.0
6. Battlement	4s	---	---	---	---
7. Biedsaw-Sunup					
8. Billings					
9. Bookcliff-Utso					
10. Borollic Calciorthids					
11. Borpark					
12. Bunkwater					
13. Caballo					
14. Callings					
15. Cameo	3e	3.0	2.0	65	5.0

See footnote at end of table.

Table 5.--Land Capability and Yields per Acre of Crops and Pasture--Continued

Map symbol and soil name	Land capability	Alfalfa hay	Grass hay	Oats	Pasture
		Tons	Tons	Bu	AUM*
16. Castino-Skisams-Winnemucca					
17. Cathedral-Veatch					
18, 19, 20. Cerro					
21. Chipeta					
22, 23. Clapper					
24. Cochetopa-Clayburn					
25 Cowestglen	4e	---	---	---	---
26. Cryochrepts-Cryoborolls-Rubble land					
27. Cryorthents-Rock outcrop					
28. Cumulic Haploborolls					
29. Debeque					
30. Debeque-Hesperus					
31 Dominguez	3s	3.5	2.5	65	6.0
32 Dominguez	3s	3.0	2.0	60	5.0
33. Emmons-Cerro-Pagoda					
34. Empedrado					
35. Empedrado-Pagoda-Godding					
36. Fluvaquents					
37 Fughes	3e	4.0	3.0	80	7.5

See footnote at end of table.

Table 5.--Land Capability and Yields per Acre of Crops and Pasture--Continued

Map symbol and soil name	Land capability	Alfalfa hay	Grass hay	Oats	Pasture
		Tons	Tons	Bu	AUM*
38. Fughes					
39:					
Fughes	4e	3.5	3.0	75	7.5
Hesperus	4e	3.5	3.0	75	7.5
40. Godding					
41. Golime					
42. Grobutte					
43. Haploborolls-Rock outcrop					
44, 45. Happle					
46. Happle-Rock outcrop					
47, 48. Hesperus-Empedrado-Pagoda					
49:					
Hesperus	4e	4.0	3.0	80	7.5
Pagoda	4e	---	3.0	---	---
50. Irigul-Starman					
51. Mesa-Avalon					
52. Northwater-Adel					
53. Pagoda-Hesperus					
54 Panitchen	3e	3.5	2.5	65	6.0
55. Parachute-Irigul					
56. Parachute-Irigul-Rhone					
57. Parachute-Rhone					
58 Peninsula	4e	4.0	2.5	75	6.0

See footnote at end of table.

Table 5.--Land Capability and Yields per Acre of Crops and Pasture--Continued

Map symbol and soil name	Land capability	Alfalfa hay	Grass hay	Oats	Pasture
		Tons	Tons	Bu	AUM*
59. Persayo					
60. Redcreek-Rentsac					
61. Rock outcrop-Torriorthents					
62. Shawa					
63. Silas					
64. Torrifluvents-Gullied land					
65, 66. Torriorthents-Rock outcrop					
67. Tosca					
68. Trail					
69. Travessilla-Rock outcrop					
70. Uffens					
71. Utso-Rock outcrop					
72. Wesdy					
73. Wesdy-Northwater					
74. Winnemucca-Castino					
75. Wrayha-Rabbitex-Veatch					
76. Wrayha-Veatch-Rabbitex					
77. Yamo-Redcreek					
78. Youngston	3e	3.5	2.5	65	6.0
79. Water					

* Animal unit month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

Table 6.--Prime Farmland

(Only the soils considered prime farmland are listed. Urban or built-up areas of the soils listed are not considered prime farmland. If a soil is prime farmland only under certain conditions, the conditions are specified in parentheses after the soil name.)

Map symbol	Soil name
5	Battlement loam, 1 to 8 percent slopes (if irrigated)
6	Battlement loam, saline, 1 to 8 percent slopes (if irrigated)
8	Billings silty clay loam, 1 to 6 percent slopes (if irrigated)
15	Cameo fine sandy loam, 1 to 6 percent slopes (if irrigated)
18	Cerro silty clay loam, 2 to 6 percent slopes (if irrigated)
25	Cowestglen sandy loam, 1 to 8 percent slopes (if irrigated)
28	Cumulic Haploborolls, 1 to 3 percent slopes (if irrigated and either protected from flooding or not frequently flooded during the growing season)
31	Dominguez clay loam, 1 to 3 percent slopes (if irrigated)
32	Dominguez clay loam, 3 to 8 percent slopes (if irrigated)
37	Fughes clay loam, 2 to 6 percent slopes (if irrigated)
38	Fughes clay loam, 3 to 9 percent slopes, stony (if irrigated)
54	Panitchen loam, 1 to 6 percent slopes (if irrigated)
58	Peninsula loam, 3 to 9 percent slopes (if irrigated)
78	Youngston loam, 1 to 6 percent slopes (if irrigated)

Ecological Sites and Characteristic Native Vegetation

Jim Kellogg, range conservationist, Natural Resources Conservation Service, helped prepare this section.

Approximately 95 percent of the survey area is either rangeland or woodland. About one-half of the area is rangeland, and 45 percent is woodland. Nearly all of the rangeland and much of the woodland has value for grazing livestock. The principal type of ranch unit is a cow-calf operation.

The average ranch consists of about 1,700 acres of privately owned land and supplemental grazing provided by Bureau of Land Management and Forest Service leases. Nearly all of the ranches in the survey area have some irrigated pasture or hayland.

The livestock graze in areas of the privately owned rangeland and woodland during spring and fall. Bureau of Land Management leases provide grazing in late spring and summer, and Forest Service leases are used during the summer. Cattle graze in irrigated areas in the fall. During the winter, livestock are fed hay.

In areas that have similar climate and topography, differences in the kind and amount of rangeland and forest understory vegetation and the tree species are closely related to the kind of soil. Effective management is based upon the relationship between the soils and vegetation and water.

Forest understory vegetation consists of grasses, forbs, shrubs, and other plants. Some pinyon, juniper, and aspen woodland, if well managed, can produce enough understory vegetation to support grazing of livestock or wildlife, or both, without damaging the trees.

The quantity and quality of understory vegetation vary with the kind of soil, the age and kind of trees in the canopy, the density of the canopy, and the depth and condition of the litter. The density of the canopy determines the amount of light that understory plants receive.

Grazing value of woodland understory can be improved by thinning the stands so that the trees are about 20 to 40 feet apart. This practice reduces competition for light and moisture. Some areas may need seeding. In areas where the slope and the content of stones in the soil are not excessive, understory production can be increased greatly by chaining or dozing the trees out and drilling grass seed. Grass species selected for seeding should be adapted to the soils and climate in the area and should meet the forage needs of the grazing animals. Leaving strips of trees standing helps to provide cover for wildlife. The thicker stands can be used for protection of livestock during storms in winter and spring and during calving and lambing season. The local office of the Natural Resources Conservation Service can provide additional information about managing woodland.

Table 7 shows, for each soil, the ecological site; the total annual production of dry-weight vegetation in favorable, normal, and unfavorable years; the characteristic native vegetation; the average percentage of each species for rangeland and for forest understory vegetation; and common trees and their site index. An explanation of the column headings in table 7 follows.

An *ecological site* is the product of all the environmental factors responsible for its development. It has characteristic soils that have developed over time throughout the soil development process; a characteristic hydrology, particularly infiltration and runoff, that has developed over time; and a characteristic plant community (kind and amount of vegetation). The hydrology of a site is influenced by development of the soil and plant community. The vegetation, soils, and hydrology are all interrelated. Each is influenced by the others and influences the development of the others. The plant community on an ecological site is typified by an association of species that differs from that of other ecological sites in the kind and/or proportion of species or in total production. Descriptions of ecological sites are provided in the Field Office Technical Guide, which is available in local offices of the Natural Resources Conservation Service.

Total production is the amount of dry-weight vegetation that can be expected to grow annually in a well managed area that is supporting the potential natural plant community. It includes all vegetation, whether or not it is palatable to grazing animals. It includes the current year's growth of leaves, twigs, and fruits of woody plants. It does not include the increase in stem diameter of trees and shrubs. It is expressed in pounds per acre of air-dry vegetation for favorable, normal, and unfavorable years. In a favorable year, the amount and distribution of precipitation and the temperatures make growing conditions substantially better than average. In a normal year, growing conditions are about average. In an unfavorable year, growing conditions are well below average, generally because of low available soil moisture. Yields are adjusted to a common percentage of air-dry moisture content.

Characteristic native vegetation—the grasses, forbs, and shrubs that make up most of the potential natural plant community on each soil—is listed by common name. Under *composition*, the expected percentage of the total annual production of rangeland and forest understory vegetation is given for each species making up the characteristic native vegetation. The amount that can be used as forage depends upon the kinds of grazing animals and on the grazing season.

Common trees are those tree species that naturally occur on a soil. The potential productivity is expressed as a *site index*. The site index is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. The site index applies to fully stocked, even-aged, unmanaged stands. In this survey area, the site index for quaking aspen was determined using a 50-year curve (Baker, 1925). A 100-year curve was used to determine the site index for Engelmann's spruce (Alexander, 1967) and for Rocky Mountain Douglas-fir (Meyer, 1961). For twoneedle pinyon and Utah juniper, site indexes were derived primarily from measurements of basal area (Howell, 1940) and tree age is not applicable. More detailed information regarding site index is available in the "National Forestry Manual," which is available in local offices of the Natural Resources Conservation Service or on the Internet.

Table 7.--Ecological Sites and Characteristic Native Vegetation

Map symbol and soil name	Ecological site	Total production: Kind of year	Total production: Dry weight	Characteristic native vegetation	Composition: Rangeland	Composition: Forest	Common trees	Site index
			Lb/acre		Pct	Pct		
1:								
Aga	Riverbottom #236	Favorable	2,000	Other perennial forbs	15	---	---	---
		Normal	1,700	Other perennial grasses	15	---		
		Unfavorable	1,500	Other shrubs	15	---		
				Western wheatgrass	15	---		
				Slender wheatgrass	10	---		
				Willow	10	---		
				Skunkbush sumac	5	---		
2:								
Badland.								
3:								
Barx	Rolling Loam #298	Favorable	1,000	Western wheatgrass	20	---	---	---
		Normal	800	Wyoming big sagebrush	15	---		
		Unfavorable	500	Indian ricegrass	10	---		
				Bottlebrush squirreltail	10	---		
				Needleandthread	10	---		
				Sandberg bluegrass	5	---		
				Other perennial forbs	5	---		
				Other shrubs	5	---		
				Prairie Junegrass	5	---		
4:								
Barx	Rolling Loam #298	Favorable	1,000	Western wheatgrass	20	---	---	---
		Normal	800	Sandberg bluegrass	15	---		
		Unfavorable	500	Wyoming big sagebrush	15	---		
				Indian ricegrass	10	---		
				Bottlebrush squirreltail	10	---		
				Needleandthread	10	---		
				Other perennial forbs	5	---		
				Other shrubs	5	---		
				Prairie Junegrass	5	---		
Clapper	Foothill Juniper #447	Favorable	400	Galleta	---	15	Utah juniper	44
		Normal	350	Sandberg bluegrass	---	10		
		Unfavorable	250	Bluebunch wheatgrass	---	10		
				Bottlebrush squirreltail	---	10		
				Other perennial forbs	---	10		
				Other shrubs	---	10		
				Indian ricegrass	---	5		
				Wyoming big sagebrush	---	5		
				True mountain mahogany	---	5		

Table 7.--Ecological Sites and Characteristic Native Vegetation--Continued

Map symbol and soil name	Ecological site	Total production: Kind of year	Total production: Dry weight	Characteristic native vegetation	Composition: Rangeland	Composition: Forest	Common trees	Site index
			Lb/acre		Pct	Pct		
5:								
Battlement------	Foothill Swale #285-------------	Favorable	3,000	Basin wildrye-------------------	30	---	---	---
		Normal	2,000	Western wheatgrass--------------	20	---		
		Unfavorable	1,000	Other perennial grasses---------	15	---		
				Basin big sagebrush-------------	10	---		
				Other perennial forbs-----------	10	---		
				Fourwing saltbush---------------	5	---		
6:								
Battlement------	Salt Meadow #266----------------	Favorable	2,500	Alkali sacaton------------------	35	---	---	---
		Normal	2,000	Inland saltgrass----------------	15	---		
		Unfavorable	1,500	Western wheatgrass--------------	15	---		
				Fourwing saltbush---------------	5	---		
				Greasewood----------------------	5	---		
				Rush----------------------------	5	---		
				Sedge---------------------------	5	---		
				Tall rabbitbrush----------------	5	---		
7:								
Biedsaw---------	Foothill Juniper #447-----------	Favorable	450	Indian ricegrass----------------	---	15	Twoneedle pinyon----------	55
		Normal	300	Bluebunch wheatgrass------------	---	15	Utah juniper--------------	---
		Unfavorable	200	Galleta-------------------------	---	15		
				Bottlebrush squirreltail--------	---	10		
				Other perennial forbs-----------	---	10		
Sunup-----------	Foothill Juniper #447-----------	Favorable	450	Indian ricegrass----------------	---	15	Twoneedle pinyon----------	50
		Normal	300	Bluebunch wheatgrass------------	---	15	Utah juniper--------------	---
		Unfavorable	200	Galleta-------------------------	---	15		
				Bottlebrush squirreltail--------	---	10		
				Mormon tea----------------------	---	5		
				Sandberg bluegrass--------------	---	5		
				Wyoming big sagebrush-----------	---	5		
				Needleandthread-----------------	---	5		
8:								
Billings--------	Salt Flats #262-----------------	Favorable	1,000	Alkali sacaton------------------	20	---	---	---
		Normal	700	Inland saltgrass----------------	15	---		
		Unfavorable	500	Western wheatgrass--------------	15	---		
				Bottlebrush squirreltail--------	10	---		
				Needleandthread-----------------	10	---		
				Indian ricegrass----------------	5	---		
				Greasewood----------------------	5	---		

Table 7.--Ecological Sites and Characteristic Native Vegetation--Continued

Map symbol and soil name	Ecological site	Total production: Kind of year	Total production: Dry weight	Characteristic native vegetation	Composition: Rangeland	Composition: Forest	Common trees	Site index
			Lb/acre		Pct	Pct		
9:								
Bookcliff	Mountain Loam #228	Favorable	1,800	Arizona fescue	20	---	---	---
		Normal	1,500	Big bluegrass	10	---		
		Unfavorable	1,200	Mountain big sagebrush	10	---		
				Western wheatgrass	10	---		
				Letterman's needlegrass	5	---		
				Nodding brome	5	---		
				Slender wheatgrass	5	---		
Utso	Mountain Loam #228	Favorable	1,800	Arizona fescue	20	---	---	---
		Normal	1,500	Big bluegrass	10	---		
		Unfavorable	1,200	Mountain big sagebrush	10	---		
				Western wheatgrass	10	---		
				Letterman's needlegrass	5	---		
				Nodding brome	5	---		
				Slender wheatgrass	5	---		
10:								
Borollic Calciorthids	Similar to Brushy Loam #238	Favorable	1,700	Gambel's oak	15	---	---	---
		Normal	1,500	Saskatoon serviceberry	15	---		
		Unfavorable	1,000	True mountain mahogany	15	---		
				Big bluegrass	10	---		
				Western wheatgrass	10	---		
11:								
Borpark	Brushy Loam #238	Favorable	1,800	Gambel's oak	20	---	---	---
		Normal	1,500	Saskatoon serviceberry	10	---		
		Unfavorable	1,200	Western wheatgrass	10	---		
				Indian ricegrass	5	---		
				Antelope bitterbrush	5	---		
				Mountain big sagebrush	5	---		
				Prairie Junegrass	5	---		
				Squaw apple	5	---		
12:								
Bunkwater	Alkaline Slopes #297	Favorable	700	Greasewood	20	---	---	---
		Normal	500	Shadscale saltbush	15	---		
		Unfavorable	400	Wyoming big sagebrush	10	---		
				Galleta	10	---		
				Western wheatgrass	10	---		
				Indian ricegrass	5	---		

Table 7.--Ecological Sites and Characteristic Native Vegetation--Continued

Map symbol and soil name	Ecological site	Total production: Kind of year	Total production: Dry weight	Characteristic native vegetation	Composition: Rangeland	Composition: Forest	Common trees	Site index
			Lb/acre		Pct	Pct		
13:								
Caballo---------	Rocky Mountain Douglas-Fir------	Favorable	500	Common juniper------------------	---	20	Rocky Mountain Douglas-fir	64
		Normal	400	Saskatoon serviceberry----------	---	15		
		Unfavorable	350	Kinnikinnick--------------------	---	10		
				Other perennial forbs-----------	---	10		
				Other perennial grasses---------	---	10		
				Oregongrape---------------------	---	5		
				Elk sedge-----------------------	---	5		
14:								
Callings--------	Engelmann's Spruce/Subalpine Fir	Favorable	550	Grouse whortleberry-------------	---	20	Engelmann's spruce--------	77
		Normal	400	Boxleaf myrtle------------------	---	10	Subalpine fir-------------	---
		Unfavorable	300	Elk sedge-----------------------	---	10		
				Heartleaf arnica----------------	---	5		
				Silvery lupine------------------	---	5		
15:								
Cameo-----------	Saltdesert Overflow #407--------	Favorable	3,000	Alkali sacaton------------------	30	---	---	---
		Normal	2,000	Fourwing saltbush---------------	15	---		
		Unfavorable	1,500	Basin big sagebrush-------------	10	---		
				Basin wildrye-------------------	10	---		
				Galleta-------------------------	10	---		
16:								
Castino---------	Wet Subalpine #253--------------	Favorable	3,000	Nodding brome-------------------	10	---	---	---
		Normal	2,300	Red fescue----------------------	10	---		
		Unfavorable	1,800	Sheep fescue--------------------	10	---		
				Slender wheatgrass--------------	10	---		
				Tufted hairgrass----------------	10	---		
				Shrubby cinquefoil--------------	5	---		
Skisams---------	Shallow Subalpine #251----------	Favorable	2,500	Columbia needlegrass------------	15	---	---	---
		Normal	1,000	Letterman's needlegrass---------	15	---		
		Unfavorable	750	Arizona fescue------------------	10	---		
				Muttongrass---------------------	10	---		
				Prairie sagewort----------------	10	---		
				Silver sagebrush----------------	10	---		
				Slender wheatgrass--------------	10	---		
Winnemucca------	Wet Subalpine #253--------------	Favorable	3,000	Nodding brome-------------------	10	---	---	---
		Normal	2,300	Red fescue----------------------	10	---		
		Unfavorable	1,800	Sheep fescue--------------------	10	---		
				Slender wheatgrass--------------	10	---		
				Tufted hairgrass----------------	10	---		
				Shrubby cinquefoil--------------	5	---		

Table 7.--Ecological Sites and Characteristic Native Vegetation--Continued

Map symbol and soil name	Ecological site	Total production: Kind of year	Total production: Dry weight	Characteristic native vegetation	Composition: Rangeland	Composition: Forest	Common trees	Site index
			Lb/acre		Pct	Pct		
17:								
Cathedral	Brushy Loam #238	Favorable	3,000	Gambel's oak	20	---	---	---
		Normal	2,000	Bluegrass	15	---		
		Unfavorable	1,500	Saskatoon serviceberry	10	---		
				Elk sedge	10	---		
				Mountain brome	10	---		
				Snowberry	10	---		
Veatch	Mountain Pinyon #448	Favorable	650	Gambel's oak	---	15	Twoneedle pinyon	70
		Normal	500	Muttongrass	---	15	Utah juniper	---
		Unfavorable	350	Bluebunch wheatgrass	---	10		
				Elk sedge	---	10		
				Saskatoon serviceberry	---	5		
				True mountain mahogany	---	5		
18:								
Cerro	Deep Clay Loam #247	Favorable	2,500	Western wheatgrass	30	---	---	---
		Normal	2,000	Letterman's needlegrass	15	---		
		Unfavorable	1,500	Muttongrass	10	---		
				Slender wheatgrass	10	---		
				Mountain big sagebrush	5	---		
				Mule-ears	5	---		
				Nodding brome	5	---		
				Scarlet Indian paintbrush	5	---		
				Silvery lupine	5	---		
				Sulphur wildbuckwheat	5	---		
				Utah serviceberry	3	---		
				Mountain snowberry	2	---		
19:								
Cerro	Deep Clay Loam #247	Favorable	2,500	Western wheatgrass	30	---	---	---
		Normal	2,000	Letterman's needlegrass	15	---		
		Unfavorable	1,500	Muttongrass	10	---		
				Slender wheatgrass	10	---		
				Mountain big sagebrush	5	---		
				Mule-ears	5	---		
				Nodding brome	5	---		
				Scarlet Indian paintbrush	5	---		
				Silvery lupine	5	---		
				Sulphur wildbuckwheat	5	---		
				Utah serviceberry	3	---		
				Mountain snowberry	2	---		

Table 7.--Ecological Sites and Characteristic Native Vegetation--Continued

Map symbol and soil name	Ecological site	Total production: Kind of year	Total production: Dry weight	Characteristic native vegetation	Composition: Rangeland	Composition: Forest	Common trees	Site index
			Lb/acre		Pct	Pct		
20:								
Cerro	Deep Clay Loam #247	Favorable	2,500	Western wheatgrass	30	---	---	---
		Normal	2,000	Letterman's needlegrass	15	---		
		Unfavorable	1,500	Muttongrass	10	---		
				Slender wheatgrass	10	---		
				Mountain big sagebrush	5	---		
				Mule-ears	5	---		
				Nodding brome	5	---		
				Scarlet Indian paintbrush	5	---		
				Silvery lupine	5	---		
				Sulphur wildbuckwheat	5	---		
				Utah serviceberry	3	---		
				Mountain snowberry	2	---		
21:								
Chipeta	Clayey Saltdesert #403	Favorable	500	Mat saltbush	20	---	---	---
		Normal	350	Gardner's saltbush	15	---		
		Unfavorable	200	Indian ricegrass	10	---		
				Bottlebrush squirreltail	10	---		
				Shadscale saltbush	10	---		
				Western wheatgrass	10	---		
				Galleta	5	---		
22:								
Clapper	Foothill Juniper #447	Favorable	400	Galleta	---	15	Utah juniper	44
		Normal	350	Sandberg bluegrass	---	10		
		Unfavorable	250	Bluebunch wheatgrass	---	10		
				Bottlebrush squirreltail	---	10		
				Other perennial forbs	---	10		
				Other shrubs	---	10		
				Indian ricegrass	---	5		
				Wyoming big sagebrush	---	5		
				True mountain mahogany	---	5		
23:								
Clapper	Foothill Juniper #447	Favorable	400	Galleta	---	15	Utah juniper	94
		Normal	350	Sandberg bluegrass	---	10		
		Unfavorable	250	Bluebunch wheatgrass	---	10		
				Bottlebrush squirreltail	---	10		
				Other perennial forbs	---	10		
				Other shrubs	---	10		
				Indian ricegrass	---	5		
				Wyoming big sagebrush	---	5		
				True mountain mahogany	---	5		

Table 7.--Ecological Sites and Characteristic Native Vegetation--Continued

Map symbol and soil name	Ecological site	Total production: Kind of year	Total production: Dry weight	Characteristic native vegetation	Composition: Rangeland	Composition: Forest	Common trees	Site index
			Lb/acre		Pct	Pct		
24:								
Cochetopa	Quaking Aspen	Favorable	3,500	Slender wheatgrass	---	15	Quaking aspen	64
		Normal	2,800	Columbia needlegrass	---	10		
		Unfavorable	2,000	Mountain brome	---	5		
				Mountain snowberry	---	5		
				Nodding brome	---	5		
Clayburn	Quaking Aspen	Favorable	3,500	Slender wheatgrass	---	15	Quaking aspen	73
		Normal	2,800	Columbia needlegrass	---	10		
		Unfavorable	2,000	Mountain brome	---	5		
				Mountain snowberry	---	5		
				Nodding brome	---	5		
25:								
Cowestglen	Foothill Swale #285	Favorable	3,000	Basin wildrye	40	---	---	---
		Normal	2,000	Basin big sagebrush	10	---		
		Unfavorable	1,000	Other perennial forbs	10	---		
				Other perennial grasses	10	---		
				Western wheatgrass	10	---		
				Other shrubs	5	---		
26:								
Cryochrepts	Engelmann's Spruce/Subalpine Fir	Favorable	200	Elk sedge	---	20	Engelmann's spruce	---
		Normal	150	Grouse whortleberry	---	20	Subalpine fir	---
		Unfavorable	100	Heartleaf arnica	---	5		
				Silvery lupine	---	5		
Cryoborolls	Quaking Aspen	Favorable	1,800	Nevada pea	---	10	Quaking aspen	---
		Normal	1,500	Elk sedge	---	10		
		Unfavorable	1,000	Nodding brome	---	10		
				Quaking aspen	---	10		
				Saskatoon serviceberry	---	5		
				Blue wildrye	---	5		
				Mountain snowberry	---	5		
Rubble land.								
27:								
Cryorthents	Rocky Mountain Douglas-Fir	Favorable	500	Common juniper	---	20	Rocky Mountain Douglas-fir	---
		Normal	400	Saskatoon serviceberry	---	15		
		Unfavorable	350	Kinnikinnick	---	10		
				Mountain snowberry	---	10		
				Cascade Oregongrape	---	5		
				Elk sedge	---	5		
Rock outcrop.								

Table 7.--Ecological Sites and Characteristic Native Vegetation--Continued

Map symbol and soil name	Ecological site	Total production: Kind of year	Total production: Dry weight	Characteristic native vegetation	Composition: Range-land	Composition: Forest	Common trees	Site index
			Lb/acre		Pct	Pct		
28:								
Cumulic Haploborolls	Similar to Foothill Swale #285	Favorable	1,200	Western wheatgrass	25	---	---	---
		Normal	1,000	Basin wildrye	20	---		
		Unfavorable	800	Basin big sagebrush	10	---		
29:								
Debeque	Deep Loam #292	Favorable	2,000	Western wheatgrass	20	---	---	---
		Normal	1,500	Mountain big sagebrush	15	---		
		Unfavorable	900	Muttongrass	10	---		
				Other perennial forbs	10	---		
				Other shrubs	10	---		
				Prairie Junegrass	10	---		
				Gambel's oak	5	---		
30:								
Debeque	Brushy Loam #238	Favorable	3,000	Gambel's oak	20	---	---	---
		Normal	2,000	Big bluegrass	15	---		
		Unfavorable	1,500	Saskatoon serviceberry	10	---		
				Nodding brome	10	---		
				Elk sedge	5	---		
				Mountain snowberry	5	---		
Hesperus	Brushy Loam #238	Favorable	3,000	Gambel's oak	20	---	---	---
		Normal	2,000	Big bluegrass	15	---		
		Unfavorable	1,500	Saskatoon serviceberry	10	---		
				Nodding brome	10	---		
				Elk sedge	5	---		
				Mountain snowberry	5	---		
31:								
Dominguez	Semidesert Clay Loam #328	Favorable	900	Wyoming big sagebrush	15	---	---	---
		Normal	700	Saline wildrye	15	---		
		Unfavorable	500	Western wheatgrass	15	---		
				Sandberg bluegrass	10	---		
				Indian ricegrass	5	---		
				Shadscale saltbush	5	---		
32:								
Dominguez	Semidesert Clay Loam #328	Favorable	900	Wyoming big sagebrush	15	---	---	---
		Normal	700	Saline wildrye	15	---		
		Unfavorable	500	Western wheatgrass	15	---		
				Sandberg bluegrass	10	---		
				Indian ricegrass	5	---		
				Shadscale saltbush	5	---		

Table 7.--Ecological Sites and Characteristic Native Vegetation--Continued

Map symbol and soil name	Ecological site	Total production: Kind of year	Total production: Dry weight	Characteristic native vegetation	Composition: Rangeland	Composition: Forest	Common trees	Site index
			Lb/acre		Pct	Pct		
33:								
Emmons----------	Dry Mountain Shale #242---------	Favorable	500	Streambank wheatgrass-----------	25	---	---	---
		Normal	300	Western wheatgrass--------------	15	---		
		Unfavorable	100	Bottlebrush squirreltail--------	10	---		
				Mountain big sagebrush----------	10	---		
				Saskatoon serviceberry----------	5	---		
Cerro-----------	Deep Clay Loam #247-------------	Favorable	2,500	Western wheatgrass--------------	30	---	---	---
		Normal	2,000	Letterman's needlegrass---------	15	---		
		Unfavorable	1,500	Muttongrass---------------------	10	---		
				Slender wheatgrass--------------	10	---		
				Mountain big sagebrush----------	5	---		
				Mule-ears-----------------------	5	---		
				Nodding brome-------------------	5	---		
				Scarlet Indian paintbrush-------	5	---		
				Silvery lupine------------------	5	---		
				Sulphur wildbuckwheat-----------	5	---		
				Saskatoon serviceberry----------	3	---		
				Mountain snowberry--------------	2	---		
Pagoda----------	Brushy Loam #238----------------	Favorable	3,000	Gambel's oak--------------------	15	---	---	---
		Normal	2,000	Columbia needlegrass------------	10	---		
		Unfavorable	1,500	Saskatoon serviceberry----------	10	---		
				Mountain brome------------------	10	---		
				Letterman's needlegrass---------	5	---		
				Elk sedge-----------------------	5	---		
				Mountain snowberry--------------	5	---		
				Nodding brome-------------------	5	---		
				Slender wheatgrass--------------	5	---		
34:								
Empedrado-------	Brushy Loam #238----------------	Favorable	3,000	Gambel's oak--------------------	15	---	---	---
		Normal	2,000	Big bluegrass-------------------	15	---		
		Unfavorable	1,500	Saskatoon serviceberry----------	10	---		
				Elk sedge-----------------------	10	---		
				Mountain brome------------------	10	---		
				Slender wheatgrass--------------	7	---		
				Mountain snowberry--------------	5	---		
				Muttongrass---------------------	5	---		
				Needleandthread-----------------	5	---		
				Western wheatgrass--------------	5	---		

Table 7.--Ecological Sites and Characteristic Native Vegetation--Continued

Map symbol and soil name	Ecological site	Total production: Kind of year	Total production: Dry weight	Characteristic native vegetation	Composition: Rangeland	Composition: Forest	Common trees	Site index
			Lb/acre		Pct	Pct		
35:								
Empedrado-------	Brushy Loam #238----------------	Favorable	3,000	Gambel's oak--------------------	15	---	---	---
		Normal	2,000	Big bluegrass-------------------	15	---		
		Unfavorable	1,500	Saskatoon serviceberry----------	10	---		
				Elk sedge-----------------------	10	---		
				Mountain brome------------------	10	---		
				Slender wheatgrass--------------	7	---		
				Mountain snowberry--------------	5	---		
				Muttongrass---------------------	5	---		
				Needleandthread-----------------	5	---		
				Western wheatgrass--------------	5	---		
Pagoda----------	Brushy Loam #238----------------	Favorable	3,000	Gambel's oak--------------------	15	---	---	---
		Normal	2,000	Columbia needlegrass------------	10	---		
		Unfavorable	1,500	Saskatoon serviceberry----------	10	---		
				Mountain brome------------------	10	---		
				Letterman's needlegrass---------	5	---		
				Elk sedge-----------------------	5	---		
				Mountain snowberry--------------	5	---		
				Nodding brome-------------------	5	---		
				Slender wheatgrass--------------	5	---		
Godding---------	Brushy Loam #238----------------	Favorable	3,000	Gambel's oak--------------------	15	---	---	---
		Normal	2,000	Big bluegrass-------------------	10	---		
		Unfavorable	1,500	Elk sedge-----------------------	10	---		
				Nodding brome-------------------	10	---		
				Saskatoon serviceberry----------	5	---		
				Mountain snowberry--------------	5	---		
				Needlegrass---------------------	5	---		
				Slender wheatgrass--------------	5	---		
				Western wheatgrass--------------	5	---		
36:								
Fluvaquents-----	Riverbottom---------------------	Favorable	2,500	Basin wildrye-------------------	15	---	---	---
		Normal	2,000	Cottonwood----------------------	10	---		
		Unfavorable	1,500	Western wheatgrass--------------	10	---		
				Willow--------------------------	10	---		
				Rush----------------------------	5	---		
				Sedge---------------------------	5	---		
				Western white clematis----------	5	---		

Table 7.--Ecological Sites and Characteristic Native Vegetation--Continued

Map symbol and soil name	Ecological site	Total production: Kind of year	Total production: Dry weight	Characteristic native vegetation	Composition: Range-land	Composition: Forest	Common trees	Site index
			Lb/acre		Pct	Pct		
37:								
Fughes	Brushy Loam #238	Favorable	3,000	Gambel's oak	15	---	---	---
		Normal	2,000	Elk sedge	10	---		
		Unfavorable	1,500	Saskatoon serviceberry	5	---		
				Mountain snowberry	5	---		
				Slender wheatgrass	5	---		
				True mountain mahogany	5	---		
				Western wheatgrass	5	---		
38:								
Fughes	Brushy Loam #238	Favorable	3,000	Gambel's oak	15	---	---	---
		Normal	2,000	Elk sedge	10	---		
		Unfavorable	1,500	Saskatoon serviceberry	5	---		
				Mountain snowberry	5	---		
				Slender wheatgrass	5	---		
				True mountain mahogany	5	---		
				Western wheatgrass	5	---		
39:								
Fughes	Brushy Loam #238	Favorable	3,000	Gambel's oak	15	---	---	---
		Normal	2,000	Elk sedge	10	---		
		Unfavorable	1,500	Saskatoon serviceberry	5	---		
				Mountain snowberry	5	---		
				Slender wheatgrass	5	---		
				True mountain mahogany	5	---		
				Western wheatgrass	5	---		
Hesperus	Brushy Loam #238	Favorable	3,000	Gambel's oak	25	---	---	---
		Normal	2,000	Big bluegrass	10	---		
		Unfavorable	1,500	Elk sedge	10	---		
				Nodding brome	10	---		
				Arizona fescue	5	---		
				Saskatoon serviceberry	5	---		
				Mountain snowberry	5	---		
				Needleandthread	5	---		
				Western wheatgrass	5	---		

Table 7.--Ecological Sites and Characteristic Native Vegetation--Continued

Map symbol and soil name	Ecological site	Total production: Kind of year	Total production: Dry weight	Characteristic native vegetation	Composition: Rangeland	Composition: Forest	Common trees	Site index
			Lb/acre		Pct	Pct		
40:								
Godding	Brushy Loam #238	Favorable	3,000	Gambel's oak	15	---	---	---
		Normal	2,000	Big bluegrass	10	---		
		Unfavorable	1,500	Elk sedge	10	---		
				Nodding brome	10	---		
				Saskatoon serviceberry	5	---		
				Mountain snowberry	5	---		
				Needlegrass	5	---		
				Slender wheatgrass	5	---		
				Western wheatgrass	5	---		
41:								
Golime	Deep Loam #292	Favorable	1,800	Needleandthread	15	---	---	---
		Normal	1,500	Mountain big sagebrush	10	---		
		Unfavorable	900	Western wheatgrass	10	---		
				Saskatoon serviceberry	5	---		
				Mountain snowberry	5	---		
				Muttongrass	5	---		
				Prairie Junegrass	5	---		
42:								
Grobutte	Mountain Pinyon #448	Favorable	650	Gambel's oak	---	15	Twoneedle pinyon	40
		Normal	550	Western wheatgrass	---	15	Utah juniper	---
		Unfavorable	400	Bluebunch wheatgrass	---	10		
				Bottlebrush squirreltail	---	10		
				Mountain big sagebrush	---	10		
				Muttongrass	---	5		
				Other perennial forbs	---	5		
				Other perennial grasses	---	5		
				True mountain mahogany	---	5		
43:								
Haploborolls	Similar to Brushy Loam #238	Favorable	800	Mountain big sagebrush	20	---	---	---
		Normal	600	Western wheatgrass	20	---		
		Unfavorable	400	Indian ricegrass	15	---		
				True mountain mahogany	10	---		
Rock outcrop.								

Table 7.--Ecological Sites and Characteristic Native Vegetation--Continued

Map symbol and soil name	Ecological site	Total production: Kind of year	Total production: Dry weight	Characteristic native vegetation	Composition: Rangeland	Composition: Forest	Common trees	Site index
			Lb/acre		Pct	Pct		
44:								
Happle	Rolling Loam #298	Favorable	1,000	Western wheatgrass	20	---	---	---
		Normal	800	Wyoming big sagebrush	15	---		
		Unfavorable	500	Sandberg bluegrass	10	---		
				Bottlebrush squirreltail	10	---		
				Indian ricegrass	5	---		
				Needleandthread	5	---		
				Other perennial forbs	5	---		
				Prairie Junegrass	5	---		
				Yellow rabbitbrush	5	---		
45:								
Happle	Loamy Slopes #303	Favorable	900	Indian ricegrass	30	---	---	---
		Normal	750	Wyoming big sagebrush	10	---		
		Unfavorable	500	Bluebunch wheatgrass	10	---		
				Needleandthread	10	---		
				Other perennial grasses	10	---		
				Western wheatgrass	10	---		
				Other perennial forbs	5	---		
				True mountain mahogany	5	---		
46:								
Happle	Steep Colluvial Slopes #445	Favorable	1,000	Indian ricegrass	30	---	---	---
		Normal	850	Shadscale saltbush	20	---		
		Unfavorable	600	Bottlebrush squirreltail	15	---		
				Other perennial grasses	10	---		
				Western wheatgrass	10	---		
				Wyoming big sagebrush	5	---		
				Other perennial forbs	5	---		
Rock outcrop.								
47:								
Hesperus	Brushy Loam #238	Favorable	3,000	Gambel's oak	25	---	---	---
		Normal	2,000	Big bluegrass	10	---		
		Unfavorable	1,500	Elk sedge	10	---		
				Nodding brome	10	---		
				Arizona fescue	5	---		
				Saskatoon serviceberry	5	---		
				Mountain snowberry	5	---		
				Needleandthread	5	---		
				Western wheatgrass	5	---		

Table 7.--Ecological Sites and Characteristic Native Vegetation--Continued

Map symbol and soil name	Ecological site	Total production: Kind of year	Total production: Dry weight	Characteristic native vegetation	Composition: Rangeland	Composition: Forest	Common trees	Site index
			Lb/acre		Pct	Pct		
47:								
Empedrado	Brushy Loam #238	Favorable	3,000	Gambel's oak	15	---	---	---
		Normal	2,000	Big bluegrass	15	---		
		Unfavorable	1,500	Saskatoon serviceberry	10	---		
				Elk sedge	10	---		
				Mountain brome	10	---		
				Slender wheatgrass	7	---		
				Mountain snowberry	5	---		
				Muttongrass	5	---		
				Needleandthread	5	---		
				Western wheatgrass	5	---		
Pagoda	Brushy Loam #238	Favorable	3,000	Gambel's oak	15	---	---	---
		Normal	2,000	Saskatoon serviceberry	10	---		
		Unfavorable	1,500	Mountain brome	10	---		
				Letterman's needlegrass	5	---		
				Elk sedge	5	---		
				Mountain snowberry	5	---		
				Nodding brome	5	---		
				Slender wheatgrass	5	---		
48:								
Hesperus	Brushy Loam #238	Favorable	3,000	Gambel's oak	25	---	---	---
		Normal	2,000	Big bluegrass	10	---		
		Unfavorable	1,500	Elk sedge	10	---		
				Nodding brome	10	---		
				Arizona fescue	5	---		
				Saskatoon serviceberry	5	---		
				Mountain snowberry	5	---		
				Needleandthread	5	---		
				Western wheatgrass	5	---		
Empedrado	Brushy Loam #238	Favorable	3,000	Gambel's oak	15	---	---	---
		Normal	2,000	Big bluegrass	15	---		
		Unfavorable	1,500	Saskatoon serviceberry	10	---		
				Elk sedge	10	---		
				Mountain brome	10	---		
				Slender wheatgrass	7	---		
				Mountain snowberry	5	---		
				Muttongrass	5	---		
				Needleandthread	5	---		
				Western wheatgrass	5	---		

Table 7.--Ecological Sites and Characteristic Native Vegetation--Continued

Map symbol and soil name	Ecological site	Total production: Kind of year	Total production: Dry weight	Characteristic native vegetation	Composition: Rangeland	Composition: Forest	Common trees	Site index
			Lb/acre		Pct	Pct		
48:								
Pagoda	Brushy Loam #238	Favorable	3,000	Gambel's oak	15	---	---	---
		Normal	2,000	Saskatoon serviceberry	10	---		
		Unfavorable	1,500	Mountain brome	10	---		
				Letterman's needlegrass	5	---		
				Elk sedge	5	---		
				Mountain snowberry	5	---		
				Nodding brome	5	---		
				Slender wheatgrass	5	---		
49:								
Hesperus	Brushy Loam #238	Favorable	3,000	Gambel's oak	25	---	---	---
		Normal	2,000	Elk sedge	10	---		
		Unfavorable	1,500	Nodding brome	10	---		
				Arizona fescue	5	---		
				Saskatoon serviceberry	5	---		
				Mountain snowberry	5	---		
				Needleandthread	5	---		
				Western wheatgrass	5	---		
Pagoda	Brushy Loam #238	Favorable	3,000	Gambel's oak	15	---	---	---
		Normal	2,000	Saskatoon serviceberry	10	---		
		Unfavorable	1,500	Mountain brome	10	---		
				Letterman's needlegrass	5	---		
				Elk sedge	5	---		
				Mountain snowberry	5	---		
				Nodding brome	5	---		
				Slender wheatgrass	5	---		
50:								
Irigul	Loamy Slopes #303	Favorable	1,200	Saskatoon serviceberry	10	---	---	---
		Normal	900	Bluebunch wheatgrass	10	---		
		Unfavorable	500	Mountain big sagebrush	10	---		
				Prairie Junegrass	10	---		
				Western wheatgrass	10	---		
Starman	Dry Exposure #235	Favorable	500	Bluebunch wheatgrass	20	---	---	---
		Normal	400	Indian ricegrass	15	---		
		Unfavorable	300	Needleandthread	15	---		
				Prairie sagewort	10	---		
				Streambank wheatgrass	10	---		
				Winterfat	10	---		

Table 7.--Ecological Sites and Characteristic Native Vegetation--Continued

Map symbol and soil name	Ecological site	Total production: Kind of year	Total production: Dry weight	Characteristic native vegetation	Composition: Rangeland	Composition: Forest	Common trees	Site index
			Lb/acre		Pct	Pct		
51:								
Mesa	Loamy Saltdesert #401	Favorable	800	Indian ricegrass	25	---	---	---
		Normal	650	Galleta	20	---		
		Unfavorable	500	Shadscale saltbush	15	---		
				Rabbitbrush	6	---		
				Winterfat	5	---		
				Fourwing saltbush	4	---		
Avalon	Loamy Saltdesert #401	Favorable	800	Galleta	30	---	---	---
		Normal	700	Indian ricegrass	15	---		
		Unfavorable	500	Wyoming big sagebrush	10	---		
				Shadscale saltbush	10	---		
52:								
Northwater	Quaking Aspen	Favorable	3,500	Slender wheatgrass	---	15	Quaking aspen	58
		Normal	2,800	Columbia needlegrass	---	10		
		Unfavorable	2,000	Mountain snowberry	---	10		
				Nodding brome	---	10		
				Blue wildrye	---	5		
Adel	Engelmann's Spruce/Subalpine Fir	Favorable	400	Elk sedge	---	20	Subalpine fir	87
		Normal	300	Grouse whortleberry	---	20	Engelmann's spruce	---
		Unfavorable	200	Heartleaf arnica	---	5		
				Silvery lupine	---	5		
53:								
Pagoda	Brushy Loam #238	Favorable	3,000	Gambel's oak	15	---	---	---
		Normal	2,000	Columbia needlegrass	10	---		
		Unfavorable	1,500	Saskatoon serviceberry	10	---		
				Mountain brome	10	---		
				Letterman's needlegrass	5	---		
				Elk sedge	5	---		
				Mountain snowberry	5	---		
				Nodding brome	5	---		
				Slender wheatgrass	5	---		
Hesperus	Brushy Loam #238	Favorable	3,000	Gambel's oak	25	---	---	---
		Normal	2,000	Elk sedge	10	---		
		Unfavorable	1,500	Nodding brome	10	---		
				Saskatoon serviceberry	5	---		
				Mountain snowberry	5	---		
				Needleandthread	5	---		
				Western wheatgrass	5	---		

Table 7.--Ecological Sites and Characteristic Native Vegetation--Continued

Map symbol and soil name	Ecological site	Total production: Kind of year	Total production: Dry weight	Characteristic native vegetation	Composition: Rangeland	Composition: Forest	Common trees	Site index
			Lb/acre		Pct	Pct		
54:								
Panitchen	Foothill Swale #285	Favorable	3,000	Basin wildrye	30	---	---	---
		Normal	2,000	Basin big sagebrush	10	---		
		Unfavorable	1,000	Streambank wheatgrass	10	---		
				Western wheatgrass	10	---		
55:								
Parachute	Mountain Loam #228	Favorable	1,800	Letterman's needlegrass	15	---	---	---
		Normal	1,500	Slender wheatgrass	15	---		
		Unfavorable	1,200	Arizona fescue	10	---		
				Columbia needlegrass	10	---		
				Mountain big sagebrush	10	---		
				Saskatoon serviceberry	5	---		
				Big bluegrass	5	---		
				Mountain snowberry	5	---		
				Yellow rabbitbrush	5	---		
Irigul	Loamy Slopes #303	Favorable	1,200	Saskatoon serviceberry	10	---	---	---
		Normal	900	Bluebunch wheatgrass	10	---		
		Unfavorable	500	Mountain big sagebrush	10	---		
				Prairie Junegrass	10	---		
				Western wheatgrass	10	---		
56:								
Parachute	Brushy Loam #238	Favorable	3,000	Saskatoon serviceberry	15	---	---	---
		Normal	2,000	Elk sedge	10	---		
		Unfavorable	1,500	Mountain brome	10	---		
				Western wheatgrass	10	---		
				Columbia needlegrass	5	---		
				Letterman's needlegrass	5	---		
				Mountain big sagebrush	5	---		
				Mountain snowberry	5	---		
Irigul	Loamy Slopes #303	Favorable	1,200	Saskatoon serviceberry	10	---	---	---
		Normal	900	Bluebunch wheatgrass	10	---		
		Unfavorable	500	Bottlebrush squirreltail	10	---		
				Mountain big sagebrush	10	---		
				Prairie Junegrass	10	---		
				Western wheatgrass	10	---		

Table 7.--Ecological Sites and Characteristic Native Vegetation--Continued

Map symbol and soil name	Ecological site	Total production: Kind of year	Total production: Dry weight	Characteristic native vegetation	Composition: Rangeland	Composition: Forest	Common trees	Site index
			Lb/acre		Pct	Pct		
56:								
Rhone	Brushy Loam #238	Favorable	3,000	Saskatoon serviceberry	15	---	---	---
		Normal	2,000	Elk sedge	10	---		
		Unfavorable	1,500	Mountain brome	10	---		
				Nodding brome	10	---		
				Slender wheatgrass	10	---		
				Letterman's needlegrass	5	---		
				Mountain snowberry	5	---		
				Rose	5	---		
57:								
Parachute	Mountain Loam #228	Favorable	1,800	Letterman's needlegrass	15	---	---	---
		Normal	1,500	Arizona fescue	10	---		
		Unfavorable	1,200	Columbia needlegrass	10	---		
				Elk sedge	10	---		
				Mountain big sagebrush	10	---		
				Slender wheatgrass	10	---		
				Saskatoon serviceberry	5	---		
				Big bluegrass	5	---		
				Mountain snowberry	5	---		
Rhone	Mountain Loam #228	Favorable	1,800	Arizona fescue	10	---	---	---
		Normal	1,500	Letterman's needlegrass	10	---		
		Unfavorable	1,200	Mountain big sagebrush	10	---		
				Muttongrass	10	---		
				Slender wheatgrass	10	---		
				Saskatoon serviceberry	5	---		
				Elk sedge	5	---		
				Mountain snowberry	5	---		
				Other shrubs	5	---		
58:								
Peninsula	Deep Loam #292	Favorable	1,800	Needleandthread	15	---	---	---
		Normal	1,500	Mountain big sagebrush	10	---		
		Unfavorable	900	Other perennial forbs	10	---		
				Western wheatgrass	10	---		
				Saskatoon serviceberry	5	---		
				Mountain snowberry	5	---		
				Muttongrass	5	---		
				Prairie Junegrass	5	---		

Table 7.--Ecological Sites and Characteristic Native Vegetation--Continued

Map symbol and soil name	Ecological site	Total production: Kind of year	Total production: Dry weight	Characteristic native vegetation	Composition: Rangeland	Composition: Forest	Common trees	Site index
			Lb/acre		Pct	Pct		
59:								
Persayo	Silty Saltdesert #410	Favorable	650	Galleta	35	---	---	---
		Normal	500	Shadscale saltbush	15	---		
		Unfavorable	400	Indian ricegrass	5	---		
				Blue grama	5	---		
				Bottlebrush squirreltail	5	---		
				Bud sagebrush	5	---		
				Fourwing saltbush	5	---		
				Saline wildrye	5	---		
				Spiny phlox	5	---		
				Western wheatgrass	5	---		
				Yellow rabbitbrush	5	---		
60:								
Redcreek	Mountain Pinyon #448	Favorable	650	Gambel's oak	---	15	Twoneedle pinyon	105
		Normal	500	Muttongrass	---	15	Juniper	---
		Unfavorable	350	Western wheatgrass	---	15		
				Bluebunch wheatgrass	---	10		
				Elk sedge	---	10		
				Prairie Junegrass	---	10		
Rentsac	Mountain Pinyon #448	Favorable	650	Gambel's oak	---	15	Twoneedle pinyon	65
		Normal	550	Western wheatgrass	---	15	Juniper	---
		Unfavorable	400	Bluebunch wheatgrass	---	10		
				Muttongrass	---	10		
				Other perennial grasses	---	10		
				Other shrubs	---	10		
				Prairie Junegrass	---	10		
				Other perennial forbs	---	5		
61:								
Rock outcrop.								
Torriorthents	Pinyon/Juniper	Favorable	400	Saline wildrye	---	40	Utah juniper	---
		Normal	200	Shadscale saltbush	---	20	Twoneedle pinyon	---
		Unfavorable	100	Indian ricegrass	---	10		
				Bluebunch wheatgrass	---	10		
				Western wheatgrass	---	5		
62:								
Shawa	Deep Loam #292	Favorable	1,800	Mountain big sagebrush	15	---	---	---
		Normal	1,500	Western wheatgrass	15	---		
		Unfavorable	900	Muttongrass	10	---		
				Prairie Junegrass	10	---		
				Saskatoon serviceberry	5	---		
				Needleandthread	5	---		

Table 7.--Ecological Sites and Characteristic Native Vegetation--Continued

Map symbol and soil name	Ecological site	Total production: Kind of year	Total production: Dry weight	Characteristic native vegetation	Composition: Rangeland	Composition: Forest	Common trees	Site index
			Lb/acre		Pct	Pct		
63:								
Silas	Mountain Swale #245	Favorable	3,000	Western wheatgrass	30	---	---	---
		Normal	2,500	Basin wildrye	20	---		
		Unfavorable	2,000	Mountain big sagebrush	15	---		
				Columbia needlegrass	10	---		
				Slender wheatgrass	10	---		
64:								
Torrifluvents	Similar to Saltdesert Overflow #407.	Favorable	500	Greasewood	25	---	---	---
		Normal	300	Inland saltgrass	20	---		
		Unfavorable	100	Western wheatgrass	15	---		
				Basin big sagebrush	5	---		
Gullied land.								
65:								
Torriorthents	Pinyon/Juniper	Favorable	800	Gambel's oak	---	20	Utah juniper	---
		Normal	500	Other perennial grasses	---	15	Twoneedle pinyon	---
		Unfavorable	200	Indian ricegrass	---	10		
				Mountain big sagebrush	---	10		
				Saskatoon serviceberry	---	5		
				Wyoming big sagebrush	---	5		
				Western wheatgrass	---	5		
Rock outcrop.								
66:								
Torriorthents	Pinyon/Juniper	Favorable	400	Saline wildrye	---	30	Utah juniper	---
		Normal	200	Shadscale saltbush	---	20	Twoneedle pinyon	---
		Unfavorable	100	Indian ricegrass	---	10		
				Wyoming big sagebrush	---	10		
				Bluebunch wheatgrass	---	10		
				Gambel's oak	---	5		
				Utah serviceberry	---	5		
				Western wheatgrass	---	5		
Rock outcrop.								
67:								
Tosca	Brushy Loam #238	Favorable	2,500	Saskatoon serviceberry	30	---	---	---
		Normal	1,800	Gambel's oak	10	---		
		Unfavorable	1,400	Elk sedge	10	---		
				Mountain brome	10	---		
				Mountain snowberry	10	---		
				Slender wheatgrass	10	---		

Table 7.--Ecological Sites and Characteristic Native Vegetation--Continued

Map symbol and soil name	Ecological site	Total production: Kind of year	Total production: Dry weight	Characteristic native vegetation	Composition: Range-land	Composition: Forest	Common trees	Site index
			Lb/acre		Pct	Pct		
68:								
Trail	Salt Flats #262	Favorable	1,100	Alkali sacaton	15	---	---	---
		Normal	700	Greasewood	10	---		
		Unfavorable	500	Inland saltgrass	10	---		
				Western wheatgrass	10	---		
				Indian ricegrass	5	---		
				Bottlebrush squirreltail	5	---		
69:								
Travessilla	Foothill Juniper #447	Favorable	450	Galleta	---	15	Twoneedle pinyon	40
		Normal	300	Sandberg bluegrass	---	10	Juniper	---
		Unfavorable	200	Bluebunch wheatgrass	---	10		
				Bottlebrush squirreltail	---	10		
				Needleandthread	---	10		
				Indian ricegrass	---	5		
				Other perennial forbs	---	5		
Rock outcrop.								
70:								
Uffens	Salt Flats #262	Favorable	900	Alkali sacaton	25	---	---	---
		Normal	700	Fourwing saltbush	10	---		
		Unfavorable	500	Greasewood	10	---		
				Inland saltgrass	10	---		
				Other perennial forbs	10	---		
				Western wheatgrass	10	---		
71:								
Utso	Rocky Mountain Douglas-Fir	Favorable	600	Other perennial forbs	---	15	Rocky Mountain Douglas-fir	61
		Normal	500	Mountain brome	---	10		
		Unfavorable	400	Mountain snowberry	---	10		
				Nodding brome	---	10		
				Other perennial grasses	---	10		
				Other shrubs	---	10		
				Common chokecherry	---	5		
				Elk sedge	---	5		
				Kinnikinnick	---	5		
Rock outcrop.								

Table 7.--Ecological Sites and Characteristic Native Vegetation--Continued

Map symbol and soil name	Ecological site	Total production: Kind of year	Total production: Dry weight	Characteristic native vegetation	Composition: Range-land	Composition: Forest	Common trees	Site index
			Lb/acre		Pct	Pct		
72:								
Wesdy	Quaking Aspen	Favorable	3,000	Nodding brome	---	15	Quaking aspen	59
		Normal	2,500	Columbia needlegrass	---	10	Engelmann's spruce	---
		Unfavorable	2,000	Letterman's needlegrass	---	10	Subalpine fir	---
				Saskatoon serviceberry	---	10		
				Blue wildrye	---	10		
				Mountain snowberry	---	10		
				Nevada pea	---	5		
				Slender cinquefoil	---	5		
				Slender wheatgrass	---	5		
				Yarrow	---	5		
73:								
Wesdy	Quaking Aspen	Favorable	3,000	Mountain brome	---	15	Quaking aspen	59
		Normal	2,500	Columbia needlegrass	---	10	Engelmann's spruce	---
		Unfavorable	2,000	Mountain snowberry	---	10	Subalpine fir	---
				Nevada pea	---	5		
				Slender cinquefoil	---	5		
				Slender wheatgrass	---	5		
Northwater	Quaking Aspen	Favorable	3,500	Slender wheatgrass	---	15	Quaking aspen	65
		Normal	2,800	Columbia needlegrass	---	10		
		Unfavorable	2,000	Saskatoon serviceberry	---	10		
				Mountain brome	---	10		
				Mountain snowberry	---	10		
				Blue wildrye	---	5		
74:								
Winnemucca	Wet Subalpine #253	Favorable	3,000	Nodding brome	10	---	---	---
		Normal	2,300	Red fescue	10	---		
		Unfavorable	1,800	Sheep fescue	10	---		
				Slender wheatgrass	10	---		
				Tufted hairgrass	10	---		
				Shrubby cinquefoil	5	---		
Castino	Wet Subalpine #253	Favorable	3,000	Nodding brome	10	---	---	---
		Normal	2,300	Red fescue	10	---		
		Unfavorable	1,800	Sheep fescue	10	---		
				Slender wheatgrass	10	---		
				Tufted hairgrass	10	---		
				Shrubby cinquefoil	5	---		

Table 7.--Ecological Sites and Characteristic Native Vegetation--Continued

Map symbol and soil name	Ecological site	Total production: Kind of year	Total production: Dry weight	Characteristic native vegetation	Composition: Range-land	Composition: Forest	Common trees	Site index
			Lb/acre		Pct	Pct		
75:								
Wrayha	Mountain Pinyon #448	Favorable	650	Gambel's oak	---	15	Twoneedle pinyon	75
		Normal	550	Western wheatgrass	---	15	Utah juniper	---
		Unfavorable	400	Bluebunch wheatgrass	---	10		
				Muttongrass	---	10		
				Other perennial grasses	---	10		
				Other shrubs	---	10		
				Prairie Junegrass	---	10		
				Other perennial forbs	---	5		
Rabbitex	Mountain Pinyon #448	Favorable	650	Gambel's oak	---	15	Twoneedle pinyon	60
		Normal	550	Western wheatgrass	---	15	Juniper	---
		Unfavorable	400	Bluebunch wheatgrass	---	10		
				Muttongrass	---	10		
				Other perennial grasses	---	10		
				Other shrubs	---	10		
				Prairie Junegrass	---	10		
				Other perennial forbs	---	5		
Veatch	Mountain Pinyon #448	Favorable	650	Gambel's oak	---	15	Twoneedle pinyon	70
		Normal	500	Muttongrass	---	15	Utah juniper	---
		Unfavorable	350	Bluebunch wheatgrass	---	10		
				Elk sedge	---	10		
				Saskatoon serviceberry	---	5		
				True mountain mahogany	---	5		
76:								
Wrayha	Mountain Pinyon #448	Favorable	650	Gambel's oak	---	15	Twoneedle pinyon	75
		Normal	550	Western wheatgrass	---	15	Utah juniper	---
		Unfavorable	400	Bluebunch wheatgrass	---	10		
				Muttongrass	---	10		
				Other perennial grasses	---	10		
				Other shrubs	---	10		
				Prairie Junegrass	---	10		
				Other perennial forbs	---	5		
Veatch	Mountain Pinyon #448	Favorable	650	Gambel's oak	---	15	Twoneedle pinyon	70
		Normal	500	Muttongrass	---	15	Utah juniper	---
		Unfavorable	400	Bluebunch wheatgrass	---	10		
				Elk sedge	---	10		
				Saskatoon serviceberry	---	5		
				True mountain mahogany	---	5		

Table 7.--Ecological Sites and Characteristic Native Vegetation--Continued

Map symbol and soil name	Ecological site	Total production: Kind of year	Total production: Dry weight	Characteristic native vegetation	Composition: Rangeland	Composition: Forest	Common trees	Site index
			Lb/acre		Pct	Pct		
76:								
Rabbitex	Mountain Pinyon #448	Favorable	650	Gambel's oak	---	15	Twoneedle pinyon	60
		Normal	550	Western wheatgrass	---	15	Juniper	---
		Unfavorable	400	Bluebunch wheatgrass	---	10		
				Muttongrass	---	10		
				Other perennial grasses	---	10		
				Other shrubs	---	10		
				Prairie Junegrass	---	10		
				Other perennial forbs	---	5		
77:								
Yamo	Deep Loam #292	Favorable	1,800	Needleandthread	20	---	---	---
		Normal	1,500	Mountain big sagebrush	15	---		
		Unfavorable	1,000	Other perennial forbs	15	---		
				Western wheatgrass	15	---		
				Muttongrass	10	---		
				Other shrubs	10	---		
				Prairie Junegrass	5	---		
Redcreek	Mountain Pinyon #448	Favorable	650	Gambel's oak	---	15	Twoneedle pinyon	105
		Normal	500	Muttongrass	---	15	Juniper	---
		Unfavorable	350	Western wheatgrass	---	15		
				Bluebunch wheatgrass	---	10		
				Elk sedge	---	10		
				Prairie Junegrass	---	10		
78:								
Youngston	Loamy Saltdesert #401	Favorable	800	Galleta	20	---	---	---
		Normal	600	Shadscale saltbush	15	---		
		Unfavorable	400	Indian ricegrass	10	---		
				Fourwing saltbush	10	---		
				Winterfat	5	---		
79:								
Water.								

Recreation

The soils of the survey area are rated in table 8a and table 8b according to limitations that affect their suitability for recreation. The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect the recreational uses. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the tables indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.00 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

The ratings in the tables are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewer lines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation also are important. Soils that are subject to flooding are limited for recreational uses by the duration and intensity of flooding and the season when flooding occurs. In planning recreational facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

The information in the tables can be supplemented by other information in this survey, for example, interpretations for building site development, construction materials, sanitary facilities, and water management.

Camp areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The ratings are based on the soil properties that affect the ease of developing camp areas and the performance of the areas after development. Slope, stoniness, and depth to bedrock or a cemented pan are the main concerns affecting the development of camp areas. The soil properties that affect the performance of the areas after development are those that influence trafficability and promote the growth of vegetation, especially in heavily used areas. For good trafficability, the surface of camp areas should absorb rainfall readily, remain firm under heavy foot traffic, and not be dusty when dry. The soil properties that influence trafficability are texture of the surface layer, depth to a water table, ponding, flooding, permeability, and large stones. The soil properties that affect the growth of plants are depth to bedrock or a cemented pan, permeability, and toxic substances in the soil.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The ratings are based on the soil properties that affect the ease of developing picnic areas and that influence trafficability and the growth of vegetation after development. Slope and stoniness are the main concerns affecting the development of picnic areas. For good trafficability, the surface of picnic areas should absorb rainfall readily, remain firm under heavy foot traffic, and not be dusty when dry. The soil properties that influence trafficability are texture of the surface layer, depth to a water table, ponding, flooding, permeability, and large stones. The soil properties that affect the growth of plants are depth to bedrock or a cemented pan, permeability, and toxic substances in the soil.

Playgrounds require soils that are nearly level, are free of stones, and can withstand intensive foot traffic. The ratings are based on the soil properties that affect the ease of developing playgrounds and that influence trafficability and the growth of vegetation after development. Slope and stoniness are the main concerns affecting the development of playgrounds. For good trafficability, the surface of the playgrounds should absorb rainfall readily, remain firm under heavy foot traffic, and not be dusty when dry. The soil properties that influence trafficability are texture of the surface layer, depth to a water table, ponding, flooding, permeability, and large stones. The soil properties that affect the growth of plants are depth to bedrock or a cemented pan, permeability, and toxic substances in the soil.

Paths and trails for hiking and horseback riding should require little or no slope modification through cutting and filling. The ratings are based on the soil

properties that affect trafficability and erodibility. These properties are stoniness, depth to a water table, ponding, flooding, slope, and texture of the surface layer.

Off-road motorcycle trails require little or no site preparation. They are not covered with surfacing material or vegetation. Considerable compaction of the soil material is likely. The ratings are based on the soil properties that influence erodibility, trafficability, dustiness, and the ease of revegetation. These properties are stoniness, slope, depth to a water table, ponding, flooding, and texture of the surface layer.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. Irrigation is not considered in the ratings. The ratings are based on the soil properties that affect plant growth and trafficability after vegetation is established. The properties that affect plant growth are reaction; depth to a water table; ponding; depth to bedrock or a cemented pan; the available water capacity in the upper 40 inches; the content of salts, sodium, or calcium carbonate; and sulfidic materials. The properties that affect trafficability are flooding, depth to a water table, ponding, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer. The suitability of the soil for traps, tees, roughs, and greens is not considered in the ratings.

Table 8a.--Recreation

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the potential limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas		Playgrounds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
1:							
Aga	85	Very limited:		Somewhat limited:		Somewhat limited:	
		Flooding	1.00	Dusty	0.50	Flooding	0.60
		Dusty	0.50			Dusty	0.50
						Slope	0.01
2:							
Badland	80	Not rated		Not rated		Not rated	
3:							
Barx	85	Somewhat limited:		Somewhat limited:		Very limited:	
		Dusty	0.50	Dusty	0.50	Slope	1.00
						Dusty	0.50
4:							
Barx	60	Somewhat limited:		Somewhat limited:		Very limited:	
		Dusty	0.50	Dusty	0.50	Slope	1.00
						Dusty	0.50
Clapper	25	Somewhat limited:		Somewhat limited:		Very limited:	
		Dusty	0.50	Dusty	0.50	Content of large	
		Content of large		Content of large		stones	1.00
		stones	0.42	stones	0.42	Slope	1.00
						Dusty	0.50
						Gravel content	0.03
5:							
Battlement	90	Very limited:		Somewhat limited:		Somewhat limited:	
		Flooding	1.00	Dusty	0.50	Slope	0.86
		Dusty	0.50			Dusty	0.50

Table 8a.--Recreation--Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas		Playgrounds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
6:							
Battlement	90	Very limited:		Somewhat limited:		Somewhat limited:	
		Flooding	1.00	Dusty	0.50	Slope	0.86
		Dusty	0.50			Dusty	0.50
7:							
Biedsaw	45	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Dusty	0.50	Dusty	0.50	Gravel content	1.00
		Gravel content	0.25	Gravel content	0.25	Dusty	0.50
Sunup	25	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Dusty	0.50	Dusty	0.50	Gravel content	1.00
		Gravel content	0.06	Gravel content	0.06	Dusty	0.50
		Restricted permeability	0.03	Restricted permeability	0.03	Content of large stones	0.08
8:							
Billings	90	Somewhat limited:		Somewhat limited:		Somewhat limited:	
		Restricted permeability	0.26	Restricted permeability	0.26	Slope	0.50
		Salinity	0.01	Salinity	0.01	Restricted permeability	0.26
						Salinity	0.01
9:							
Bookcliff	45	Somewhat limited:		Somewhat limited:		Very limited:	
		Slope	0.96	Slope	0.96	Slope	1.00
Utso	40	Somewhat limited:		Somewhat limited:		Very limited:	
		Slope	0.96	Slope	0.96	Gravel content	1.00
		Gravel content	0.32	Gravel content	0.32	Slope	1.00
10:							
Borollic Calciorthids	80	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Dusty	0.50	Dusty	0.50	Dusty	0.50
11:							
Borpark	70	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Content of large stones	0.42	Content of large stones	0.42	Content of large stones	1.00
12:							
Bunkwater	85	Very limited:		Very limited:		Very limited:	
		Sodium content	1.00	Sodium content	1.00	Sodium content	1.00
		Dusty	0.50	Dusty	0.50	Slope	0.86
						Dusty	0.50
13:							
Caballo	85	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Gravel content	1.00
		Gravel content	0.98	Gravel content	0.98	Slope	1.00
						Content of large stones	0.20

Table 8a.--Recreation--Continued

Map symbol and soil name	Pct. of map unit	Camp areas: Rating class and limiting features	Camp areas: Value	Picnic areas: Rating class and limiting features	Picnic areas: Value	Playgrounds: Rating class and limiting features	Playgrounds: Value
14:							
Callings	90	Somewhat limited:		Somewhat limited:		Very limited:	
		Restricted permeability	0.58	Restricted permeability	0.58	Slope	1.00
						Restricted permeability	0.58
						Gravel content	0.50
15:							
Cameo	90	Very limited:		Not limited		Somewhat limited:	
		Flooding	1.00			Slope	0.50
16:							
Castino	40	Somewhat limited:		Somewhat limited:		Very limited:	
		Restricted permeability	0.58	Restricted permeability	0.58	Slope	1.00
						Restricted permeability	0.58
						Depth to bedrock	0.42
Skisams	25	Very limited:		Very limited:		Very limited:	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
						Slope	1.00
Winnemucca	20	Somewhat limited:		Somewhat limited:		Very limited:	
		Restricted permeability	0.58	Restricted permeability	0.58	Slope	1.00
						Restricted permeability	0.58
17:							
Cathedral	40	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Content of large stones	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	1.00
		Content of large stones	0.61	Content of large stones	0.61	Depth to bedrock	1.00
		Restricted permeability	0.58	Restricted permeability	0.58	Restricted permeability	0.58
						Gravel content	0.52
Veatch	40	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
						Depth to bedrock	0.42
18:							
Cerro	80	Somewhat limited:		Somewhat limited:		Somewhat limited:	
		Restricted permeability	0.03	Restricted permeability	0.03	Slope	0.50
						Restricted permeability	0.03
19:							
Cerro	70	Somewhat limited:		Somewhat limited:		Very limited:	
		Slope	0.04	Slope	0.04	Slope	1.00
		Restricted permeability	0.03	Restricted permeability	0.03	Restricted permeability	0.03
20:							
Cerro	80	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Restricted permeability	0.03	Restricted permeability	0.03	Restricted permeability	0.03

Table 8a.--Recreation--Continued

Map symbol and soil name	Pct. of map unit	Camp areas: Rating class and limiting features	Camp areas: Value	Picnic areas: Rating class and limiting features	Picnic areas: Value	Playgrounds: Rating class and limiting features	Playgrounds: Value
21:							
Chipeta	85	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	1.00
		Salinity	0.50	Salinity	0.50	Salinity	0.50
		Restricted permeability	0.03	Restricted permeability	0.03	Restricted permeability	0.03
22:							
Clapper	85	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Content of large stones	1.00
		Dusty	0.50	Dusty	0.50	Slope	1.00
		Content of large stones	0.42	Content of large stones	0.42	Dusty	0.50
						Gravel content	0.03
23:							
Clapper	85	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Content of large stones	1.00
		Dusty	0.50	Dusty	0.50	Slope	1.00
		Content of large stones	0.42	Content of large stones	0.42	Dusty	0.50
						Gravel content	0.03
24:							
Cochetopa	50	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Restricted permeability	0.58	Restricted permeability	0.58	Restricted permeability	0.58
Clayburn	20	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
25:							
Cowestglen	90	Very limited:		Not limited		Somewhat limited:	
		Flooding	1.00			Slope	0.86
26:							
Cryochrepts	35	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Content of large stones	1.00
		Content of large stones	1.00	Content of large stones	1.00	Slope	1.00
Cryoborolls	30	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
						Depth to bedrock	1.00
						Gravel content	0.33
						Content of large stones	0.03
Rubble land	25	Not rated		Not rated		Not rated	
27:							
Cryorthents	55	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Gravel content	1.00
		Gravel content	1.00	Gravel content	1.00	Slope	1.00
						Depth to bedrock	0.84
						Content of large stones	0.11

Table 8a.--Recreation--Continued

Map symbol and soil name	Pct. of map unit	Camp areas: Rating class and limiting features	Value	Picnic areas: Rating class and limiting features	Value	Playgrounds: Rating class and limiting features	Value
27:							
Rock outcrop	30	Not rated		Not rated		Not rated	
28:							
Cumulic Haploborolls	90	Very limited:		Somewhat limited:		Very limited:	
		Flooding	1.00	Gravel content	0.09	Gravel content	1.00
		Gravel content	0.09			Flooding	0.60
						Content of large stones	0.20
						Slope	0.01
29:							
Debeque	85	Very limited:		Very limited:		Very limited:	
		Gravel content	1.00	Gravel content	1.00	Gravel content	1.00
		Slope	0.84	Slope	0.84	Slope	1.00
						Content of large stones	0.01
30:							
Debeque	40	Very limited:		Very limited:		Very limited:	
		Gravel content	1.00	Gravel content	1.00	Gravel content	1.00
		Slope	1.00	Slope	1.00	Slope	1.00
						Content of large stones	0.01
Hesperus	35	Somewhat limited:		Somewhat limited:		Very limited:	
		Slope	0.16	Slope	0.16	Slope	1.00
31:							
Dominguez	85	Somewhat limited:		Somewhat limited:		Somewhat limited:	
		Restricted permeability	0.03	Restricted permeability	0.03	Restricted permeability	0.03
						Slope	0.01
32:							
Dominguez	80	Somewhat limited:		Somewhat limited:		Very limited:	
		Restricted permeability	0.03	Restricted permeability	0.03	Slope	1.00
						Restricted permeability	0.03
33:							
Emmons	30	Somewhat limited:		Somewhat limited:		Very limited:	
		Slope	0.84	Slope	0.84	Slope	1.00
		Dusty	0.50	Dusty	0.50	Dusty	0.50
						Content of large stones	0.01
Cerro	25	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Restricted permeability	0.03	Restricted permeability	0.03	Restricted permeability	0.03
Pagoda	25	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Restricted permeability	0.58	Restricted permeability	0.58	Restricted permeability	0.58
34:							
Empedrado	80	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00

Table 8a.--Recreation--Continued

Map symbol and soil name	Pct. of map unit	Camp areas: Rating class and limiting features	Camp areas: Value	Picnic areas: Rating class and limiting features	Picnic areas: Value	Playgrounds: Rating class and limiting features	Playgrounds: Value
35:							
Empedrado	35	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
Pagoda	30	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Restricted permeability	0.58	Restricted permeability	0.58	Restricted permeability	0.58
Godding	25	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Restricted permeability	0.58	Restricted permeability	0.58	Gravel content	0.78
						Content of large stones	0.68
						Restricted permeability	0.58
36:							
Fluvaquents	80	Very limited:		Somewhat limited:		Somewhat limited:	
		Flooding	1.00	Depth to saturated zone	0.03	Flooding	0.60
		Depth to saturated zone	0.08			Depth to saturated zone	0.08
						Slope	0.01
						Content of large stones	0.01
37:							
Fughes	90	Somewhat limited:		Somewhat limited:		Somewhat limited:	
		Restricted permeability	0.81	Restricted permeability	0.81	Restricted permeability	0.81
						Slope	0.50
38:							
Fughes	90	Somewhat limited:		Somewhat limited:		Very limited:	
		Restricted permeability	0.81	Restricted permeability	0.81	Slope	1.00
						Restricted permeability	0.81
39:							
Fughes	60	Somewhat limited:		Somewhat limited:		Very limited:	
		Restricted permeability	0.81	Restricted permeability	0.81	Slope	1.00
						Restricted permeability	0.81
Hesperus	25	Not limited		Not limited		Very limited:	
						Slope	1.00
40:							
Godding	75	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Restricted permeability	0.58	Restricted permeability	0.58	Gravel content	0.78
						Content of large stones	0.68
						Restricted permeability	0.58

Table 8a.--Recreation--Continued

Map symbol and soil name	Pct. of map unit	Camp areas: Rating class and limiting features	Value	Picnic areas: Rating class and limiting features	Value	Playgrounds: Rating class and limiting features	Value
41:							
Golime	80	Somewhat limited:		Somewhat limited:		Very limited:	
		Restricted permeability	0.81	Restricted permeability	0.81	Slope	1.00
		Slope	0.16	Slope	0.16	Content of large stones	1.00
		Content of large stones	0.08	Content of large stones	0.08	Restricted permeability	0.81
						Gravel content	0.19
42:							
Grobutte	90	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Gravel content	1.00
		Gravel content	1.00	Gravel content	1.00	Slope	1.00
		Dusty	0.50	Dusty	0.50	Dusty	0.50
43:							
Haploborolls	60	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Restricted permeability	0.58	Restricted permeability	0.58	Restricted permeability	0.58
						Depth to bedrock	0.10
Rock outcrop	30	Not rated		Not rated		Not rated	
44:							
Happle	80	Very limited:		Very limited:		Very limited:	
		Gravel content	1.00	Gravel content	1.00	Gravel content	1.00
						Slope	1.00
						Content of large stones	0.03
45:							
Happle	80	Very limited:		Very limited:		Very limited:	
		Gravel content	1.00	Gravel content	1.00	Gravel content	1.00
		Slope	1.00	Slope	1.00	Slope	1.00
						Content of large stones	0.03
46:							
Happle	50	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Gravel content	1.00
		Gravel content	1.00	Gravel content	1.00	Slope	1.00
						Content of large stones	0.03
Rock outcrop	35	Not rated		Not rated		Not rated	
47:							
Hesperus	35	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
Empedrado	30	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
Pagoda	20	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Restricted permeability	0.58	Restricted permeability	0.58	Restricted permeability	0.58

Table 8a.--Recreation--Continued

Map symbol and soil name	Pct. of map unit	Camp areas: Rating class and limiting features	Value	Picnic areas: Rating class and limiting features	Value	Playgrounds: Rating class and limiting features	Value
48:							
Hesperus	35	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
Empedrado	30	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
Pagoda	20	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Restricted permeability	0.58	Restricted permeability	0.58	Restricted permeability	0.58
49:							
Hesperus	45	Not limited		Not limited		Very limited:	
						Slope	1.00
Pagoda	40	Somewhat limited:		Somewhat limited:		Very limited:	
		Restricted permeability	0.58	Restricted permeability	0.58	Slope	1.00
						Restricted permeability	0.58
50:							
Irigul	40	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Gravel content	1.00
		Gravel content	0.05	Gravel content	0.05	Slope	1.00
Starman	30	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	1.00
		Restricted permeability	0.58	Restricted permeability	0.58	Gravel content	1.00
		Gravel content	0.04	Gravel content	0.04	Restricted permeability	0.58
						Content of large stones	0.54
51:							
Mesa	50	Somewhat limited:		Somewhat limited:		Very limited:	
		Restricted permeability	0.58	Restricted permeability	0.58	Slope	1.00
		Dusty	0.50	Dusty	0.50	Restricted permeability	0.58
Avalon	35	Somewhat limited:		Somewhat limited:		Very limited:	
		Dusty	0.50	Dusty	0.50	Slope	1.00
		Salinity	0.01	Salinity	0.01	Dusty	0.50
						Salinity	0.01
52:							
Northwater	50	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
Adel	40	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
53:							
Pagoda	50	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Restricted permeability	0.58	Restricted permeability	0.58	Restricted permeability	0.58

Table 8a.--Recreation--Continued

Map symbol and soil name	Pct. of map unit	Camp areas: Rating class and limiting features	Value	Picnic areas: Rating class and limiting features	Value	Playgrounds: Rating class and limiting features	Value
53:							
Hesperus	20	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
54:							
Panitchen	85	Somewhat limited:		Somewhat limited:		Somewhat limited:	
		Dusty	0.50	Dusty	0.50	Slope	0.50
						Dusty	0.50
55:							
Parachute	60	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Restricted permeability	0.58	Restricted permeability	0.58	Restricted permeability	0.58
						Depth to bedrock	0.42
Irigul	30	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Gravel content	1.00
		Gravel content	0.05	Gravel content	0.05	Slope	1.00
56:							
Parachute	35	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Restricted permeability	0.58	Restricted permeability	0.58	Restricted permeability	0.58
						Depth to bedrock	0.42
Irigul	30	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Gravel content	0.05	Gravel content	0.05	Gravel content	1.00
Rhone	20	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
57:							
Parachute	55	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Restricted permeability	0.58	Restricted permeability	0.58	Restricted permeability	0.58
						Depth to bedrock	0.42
Rhone	35	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
58:							
Peninsula	80	Not limited		Not limited		Very limited:	
						Slope	1.00
						Content of large stones	0.01
59:							
Persayo	85	Very limited:		Very limited:		Very limited:	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Slope	0.96	Slope	0.96	Slope	1.00
		Salinity	0.01	Salinity	0.01	Salinity	0.01

Table 8a.--Recreation--Continued

Map symbol and soil name	Pct. of map unit	Camp areas: Rating class and limiting features	Camp areas: Value	Picnic areas: Rating class and limiting features	Picnic areas: Value	Playgrounds: Rating class and limiting features	Playgrounds: Value
60:							
Redcreek------------	60	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	1.00
Rentsac-------------	30	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Gravel content	1.00
		Dusty	0.50	Dusty	0.50	Slope	1.00
		Gravel content	0.08	Gravel content	0.08	Dusty	0.50
						Content of large stones	0.03
61:							
Rock outcrop--------	65	Not rated		Not rated		Not rated	
Torriorthents-------	30	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Dusty	0.50	Dusty	0.50	Gravel content	1.00
		Gravel content	0.09	Gravel content	0.09	Dusty	0.50
						Content of large stones	0.20
62:							
Shawa---------------	85	Somewhat limited:		Somewhat limited:		Very limited:	
		Slope	0.63	Slope	0.63	Slope	1.00
63:							
Silas---------------	85	Very limited:		Not limited		Very limited:	
		Flooding	1.00			Slope	1.00
64:							
Torrifluvents-------	40	Very limited:		Somewhat limited:		Somewhat limited:	
		Flooding	1.00	Dusty	0.50	Flooding	0.60
		Dusty	0.50			Dusty	0.50
Gullied land--------	40	Not rated		Not rated		Not rated	
65:							
Torriorthents-------	50	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Gravel content	1.00
		Dusty	0.50	Dusty	0.50	Depth to bedrock	1.00
		Gravel content	0.09	Gravel content	0.09	Dusty	0.50
						Content of large stones	0.20
Rock outcrop--------	40	Not rated		Not rated		Not rated	
66:							
Torriorthents-------	50	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Gravel content	1.00
		Dusty	0.50	Dusty	0.50	Depth to bedrock	1.00
		Gravel content	0.09	Gravel content	0.09	Dusty	0.50
						Content of large stones	0.20

Table 8a.--Recreation--Continued

Map symbol and soil name	Pct. of map unit	Camp areas: Rating class and limiting features	Camp areas: Value	Picnic areas: Rating class and limiting features	Picnic areas: Value	Playgrounds: Rating class and limiting features	Playgrounds: Value
66:							
Rock outcrop	40	Not rated		Not rated		Not rated	
67:							
Tosca	80	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Gravel content	1.00
		Gravel content	0.68	Gravel content	0.68	Slope	1.00
68:							
Trail	90	Very limited:		Somewhat limited:		Somewhat limited:	
		Flooding	1.00	Too sandy	0.28	Too sandy	0.28
		Too sandy	0.28			Slope	0.14
69:							
Travessilla	45	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Restricted permeability	0.03	Restricted permeability	0.03	Restricted permeability	0.03
Rock outcrop	40	Not rated		Not rated		Not rated	
70:							
Uffens	85	Very limited:		Very limited:		Very limited:	
		Sodium content	1.00	Sodium content	1.00	Sodium content	1.00
		Dusty	0.50	Dusty	0.50	Slope	0.86
71:							
Utso	60	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Gravel content	1.00
		Gravel content	0.32	Gravel content	0.32	Slope	1.00
Rock outcrop	25	Not rated		Not rated		Not rated	
72:							
Wesdy	70	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Restricted permeability	0.58	Restricted permeability	0.58	Content of large stones	1.00
		Content of large stones	0.14	Content of large stones	0.14	Restricted permeability	0.58
						Gravel content	0.14
73:							
Wesdy	45	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Restricted permeability	0.58	Restricted permeability	0.58	Content of large stones	1.00
		Content of large stones	0.14	Content of large stones	0.14	Restricted permeability	0.58
						Gravel content	0.14
Northwater	40	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
74:							
Winnemucca	60	Somewhat limited:		Somewhat limited:		Very limited:	
		Restricted permeability	0.58	Restricted permeability	0.58	Slope	1.00
						Restricted permeability	0.58

Table 8a.--Recreation--Continued

Map symbol and soil name	Pct. of map unit	Camp areas: Rating class and limiting features	Value	Picnic areas: Rating class and limiting features	Value	Playgrounds: Rating class and limiting features	Value
74:							
Castino	30	Somewhat limited:		Somewhat limited:		Very limited:	
		Restricted permeability	0.58	Restricted permeability	0.58	Slope	1.00
						Restricted permeability	0.58
						Depth to bedrock	0.42
75:							
Wrayha	35	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Gravel content	0.20	Gravel content	0.20	Gravel content	1.00
		Restricted permeability	0.03	Restricted permeability	0.03	Restricted permeability	0.03
						Content of large stones	0.01
Rabbitex	20	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
Veatch	20	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
						Depth to bedrock	0.42
76:							
Wrayha	45	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Gravel content	0.20	Gravel content	0.20	Gravel content	1.00
		Restricted permeability	0.03	Restricted permeability	0.03	Restricted permeability	0.03
						Content of large stones	0.01
Veatch	25	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
						Depth to bedrock	0.42
Rabbitex	20	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
77:							
Yamo	55	Somewhat limited:		Somewhat limited:		Very limited:	
		Slope	0.96	Slope	0.96	Slope	1.00
Redcreek	35	Very limited:		Very limited:		Very limited:	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Slope	0.96	Slope	0.96	Slope	1.00
78:							
Youngston	90	Somewhat limited:		Somewhat limited:		Somewhat limited:	
		Dusty	0.50	Dusty	0.50	Slope	0.50
						Dusty	0.50
79:							
Water	100	Not rated		Not rated		Not rated	

Table 8b.--Recreation

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the potential limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct. of map unit	Paths and trails		Off-road motorcycle trails		Golf fairways	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
1:							
Aga	85	Somewhat limited:		Somewhat limited:		Somewhat limited:	
		Dusty	0.50	Dusty	0.50	Flooding	0.60
						Droughty	0.29
2:							
Badland	80	Not rated		Not rated		Not rated	
3:							
Barx	85	Somewhat limited:		Somewhat limited:		Not limited	
		Dusty	0.50	Dusty	0.50		
4:							
Barx	60	Somewhat limited:		Somewhat limited:		Not limited	
		Dusty	0.50	Dusty	0.50		
Clapper	25	Somewhat limited:		Somewhat limited:		Very limited:	
		Dusty	0.50	Dusty	0.50	Content of large stones	1.00
		Content of large stones	0.42	Content of large stones	0.42	Droughty	0.34
5:							
Battlement	90	Somewhat limited:		Somewhat limited:		Not limited	
		Dusty	0.50	Dusty	0.50		
6:							
Battlement	90	Somewhat limited:		Somewhat limited:		Not limited	
		Dusty	0.50	Dusty	0.50		
7:							
Biedsaw	45	Very limited:		Somewhat limited:		Very limited:	
		Slope	1.00	Dusty	0.50	Slope	1.00
		Dusty	0.50			Gravel content	0.25
Sunup	25	Very limited:		Somewhat limited:		Very limited:	
		Slope	1.00	Dusty	0.50	Droughty	1.00
		Dusty	0.50			Depth to bedrock	1.00
						Slope	1.00
						Content of large stones	0.08
						Gravel content	0.06
8:							
Billings	90	Not limited		Not limited		Somewhat limited:	
						Salinity	0.01
9:							
Bookcliff	45	Not limited		Not limited		Somewhat limited:	
						Slope	0.96
Utso	40	Not limited		Not limited		Somewhat limited:	
						Slope	0.96
						Gravel content	0.32
						Droughty	0.22

Table 8b.--Recreation--Continued

Map symbol and soil name	Pct. of map unit	Paths and trails: Rating class and limiting features	Value	Off-road motorcycle trails: Rating class and limiting features	Value	Golf fairways: Rating class and limiting features	Value
10:							
Borollic Calciorthids	80	Very limited:		Somewhat limited:		Very limited:	
		Slope	1.00	Slope	0.96	Slope	1.00
		Water erosion	1.00	Dusty	0.50		
		Dusty	0.50				
11:							
Borpark	70	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Content of large stones	0.42	Content of large stones	0.42	Content of large stones	1.00
12:							
Bunkwater	85	Somewhat limited:		Somewhat limited:		Very limited:	
		Dusty	0.50	Dusty	0.50	Sodium content	1.00
13:							
Caballo	85	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
						Gravel content	0.98
						Droughty	0.85
						Content of large stones	0.20
14:							
Callings	90	Not limited		Not limited		Not limited	
15:							
Cameo	90	Not limited		Not limited		Not limited	
16:							
Castino	40	Not limited		Not limited		Somewhat limited:	
						Depth to bedrock	0.42
Skisams	25	Not limited		Not limited		Very limited:	
						Depth to bedrock	1.00
						Droughty	1.00
Winnemucca	20	Not limited		Not limited		Not limited	
17:							
Cathedral	40	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Content of large stones	0.61	Content of large stones	0.61	Content of large stones	1.00
						Droughty	1.00
						Depth to bedrock	1.00
Veatch	40	Very limited:		Somewhat limited:		Very limited:	
		Slope	1.00	Slope	0.96	Slope	1.00
						Droughty	0.55
18:							
Cerro	80	Not limited		Not limited		Not limited	
19:							
Cerro	70	Not limited		Not limited		Somewhat limited:	
						Slope	0.04

Table 8b.--Recreation--Continued

Map symbol and soil name	Pct. of map unit	Paths and trails: Rating class and limiting features	Value	Off-road motorcycle trails: Rating class and limiting features	Value	Golf fairways: Rating class and limiting features	Value
20:							
Cerro	80	Somewhat limited:		Not limited		Very limited:	
		Slope	0.32			Slope	1.00
21:							
Chipeta	85	Somewhat limited:		Not limited		Very limited:	
		Slope	0.08			Depth to bedrock	1.00
						Slope	1.00
						Droughty	0.94
						Salinity	0.50
22:							
Clapper	85	Somewhat limited:		Somewhat limited:		Very limited:	
		Dusty	0.50	Dusty	0.50	Content of large stones	1.00
		Content of large stones	0.42	Content of large stones	0.42	Slope	1.00
		Slope	0.32			Droughty	0.34
23:							
Clapper	85	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Dusty	0.50	Dusty	0.50	Content of large stones	1.00
		Content of large stones	0.42	Content of large stones	0.42	Droughty	0.34
24:							
Cochetopa	50	Very limited:		Somewhat limited:		Very limited:	
		Slope	1.00	Slope	0.01	Slope	1.00
Clayburn	20	Very limited:		Somewhat limited:		Very limited:	
		Slope	1.00	Slope	0.01	Slope	1.00
25:							
Cowestglen	90	Not limited		Not limited		Not limited	
26:							
Cryochrepts	35	Very limited:		Very limited:		Very limited:	
		Content of large stones	1.00	Content of large stones	1.00	Slope	1.00
		Slope	1.00			Content of large stones	1.00
						Droughty	0.34
Cryoborolls	30	Very limited:		Not limited		Very limited:	
		Slope	1.00			Slope	1.00
						Depth to bedrock	1.00
						Droughty	0.99
Rubble land	25	Not rated		Not rated		Not rated	
27:							
Cryorthents	55	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
						Droughty	1.00
						Gravel content	1.00
						Depth to bedrock	0.84
						Content of large stones	0.11
Rock outcrop	30	Not rated		Not rated		Not rated	

Table 8b.--Recreation--Continued

Map symbol and soil name	Pct. of map unit	Paths and trails: Rating class and limiting features	Value	Off-road motorcycle trails: Rating class and limiting features	Value	Golf fairways: Rating class and limiting features	Value
28:							
Cumulic Haploborolls	90	Not limited		Not limited		Somewhat limited:	
						Flooding	0.60
						Content of large stones	0.20
						Gravel content	0.09
						Droughty	0.02
29:							
Debeque	85	Not limited		Not limited		Very limited:	
						Droughty	1.00
						Gravel content	1.00
						Slope	0.84
						Content of large stones	0.01
30:							
Debeque	40	Not limited		Not limited		Very limited:	
						Droughty	1.00
						Gravel content	1.00
						Slope	1.00
						Content of large stones	0.01
Hesperus	35	Not limited		Not limited		Somewhat limited:	
						Slope	0.16
31:							
Dominguez	85	Not limited		Not limited		Not limited	
32:							
Dominguez	80	Not limited		Not limited		Not limited	
33:							
Emmons	30	Somewhat limited:		Somewhat limited:		Somewhat limited:	
		Dusty	0.50	Dusty	0.50	Slope	0.84
Cerro	25	Somewhat limited:		Not limited		Very limited:	
		Slope	0.18			Slope	1.00
Pagoda	25	Somewhat limited:		Not limited		Very limited:	
		Slope	0.18			Slope	1.00
34:							
Empedrado	80	Very limited:		Somewhat limited:		Very limited:	
		Slope	1.00	Slope	0.78	Slope	1.00
35:							
Empedrado	35	Somewhat limited:		Not limited		Very limited:	
		Slope	0.02			Slope	1.00
Pagoda	30	Somewhat limited:		Not limited		Very limited:	
		Slope	0.02			Slope	1.00
Godding	25	Somewhat limited:		Not limited		Very limited:	
		Slope	0.02			Slope	1.00
						Content of large stones	0.68
						Droughty	0.04

Table 8b.--Recreation--Continued

Map symbol and soil name	Pct. of map unit	Paths and trails: Rating class and limiting features	Value	Off-road motorcycle trails: Rating class and limiting features	Value	Golf fairways: Rating class and limiting features	Value
36:							
Fluvaquents	80	Not limited		Not limited		Somewhat limited:	
						Flooding	0.60
						Depth to saturated zone	0.03
						Content of large stones	0.01
37:							
Fughes	90	Not limited		Not limited		Not limited	
38:							
Fughes	90	Not limited		Not limited		Not limited	
39:							
Fughes	60	Not limited		Not limited		Not limited	
Hesperus	25	Not limited		Not limited		Not limited	
40:							
Godding	75	Somewhat limited:		Not limited		Very limited:	
		Slope	0.08			Slope	1.00
						Content of large stones	0.68
						Droughty	0.03
41:							
Golime	80	Somewhat limited:		Somewhat limited:		Very limited:	
		Content of large stones	0.08	Content of large stones	0.08	Content of large stones	1.00
						Slope	0.16
						Droughty	0.01
42:							
Grobutte	90	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Dusty	0.50	Dusty	0.50	Gravel content	1.00
						Droughty	0.34
43:							
Haploborolls	60	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
						Droughty	0.28
						Depth to bedrock	0.10
Rock outcrop	30	Not rated		Not rated		Not rated	
44:							
Happle	80	Not limited		Not limited		Very limited:	
						Gravel content	1.00
						Droughty	0.82
						Content of large stones	0.03

Table 8b.--Recreation--Continued

Map symbol and soil name	Pct. of map unit	Paths and trails: Rating class and limiting features	Value	Off-road motorcycle trails: Rating class and limiting features	Value	Golf fairways: Rating class and limiting features	Value
45:							
Happle	80	Somewhat limited:		Not limited		Very limited:	
		Slope	0.32			Gravel content	1.00
						Slope	1.00
						Droughty	0.82
						Content of large stones	0.03
46:							
Happle	50	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
						Gravel content	1.00
						Droughty	0.82
						Content of large stones	0.03
Rock outcrop	35	Not rated		Not rated		Not rated	
47:							
Hesperus	35	Somewhat limited:		Not limited		Very limited:	
		Slope	0.50			Slope	1.00
Empedrado	30	Somewhat limited:		Not limited		Very limited:	
		Slope	0.50			Slope	1.00
Pagoda	20	Somewhat limited:		Not limited		Very limited:	
		Slope	0.50			Slope	1.00
48:							
Hesperus	35	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
Empedrado	30	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
Pagoda	20	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
49:							
Hesperus	45	Not limited		Not limited		Not limited	
Pagoda	40	Not limited		Not limited		Not limited	
50:							
Irigul	40	Somewhat limited:		Not limited		Very limited:	
		Slope	0.50			Droughty	1.00
						Depth to bedrock	1.00
						Slope	1.00
						Gravel content	0.05
Starman	30	Somewhat limited:		Not limited		Very limited:	
		Slope	0.50			Droughty	1.00
						Depth to bedrock	1.00
						Slope	1.00
						Content of large stones	0.54
						Gravel content	0.04

Table 8b.--Recreation--Continued

Map symbol and soil name	Pct. of map unit	Paths and trails: Rating class and limiting features	Value	Off-road motorcycle trails: Rating class and limiting features	Value	Golf fairways: Rating class and limiting features	Value
51:							
Mesa	50	Somewhat limited:		Somewhat limited:		Not limited	
		Dusty	0.50	Dusty	0.50		
Avalon	35	Somewhat limited:		Somewhat limited:		Somewhat limited:	
		Dusty	0.50	Dusty	0.50	Salinity	0.01
52:							
Northwater	50	Very limited:		Somewhat limited:		Very limited:	
		Slope	1.00	Slope	0.08	Slope	1.00
Adel	40	Very limited:		Somewhat limited:		Very limited:	
		Slope	1.00	Slope	0.08	Slope	1.00
53:							
Pagoda	50	Very limited:		Somewhat limited:		Very limited:	
		Slope	1.00	Slope	0.01	Slope	1.00
Hesperus	20	Very limited:		Somewhat limited:		Very limited:	
		Slope	1.00	Slope	0.01	Slope	1.00
54:							
Panitchen	85	Somewhat limited:		Somewhat limited:		Not limited	
		Dusty	0.50	Dusty	0.50		
55:							
Parachute	60	Somewhat limited:		Not limited		Very limited:	
		Slope	0.18			Slope	1.00
						Droughty	0.65
						Depth to bedrock	0.42
Irigul	30	Somewhat limited:		Not limited		Very limited:	
		Slope	0.18			Droughty	1.00
56:							
Parachute	35	Very limited:		Somewhat limited:		Very limited:	
		Slope	1.00	Slope	0.96	Slope	1.00
						Droughty	0.65
						Depth to bedrock	0.42
Irigul	30	Very limited:		Somewhat limited:		Very limited:	
		Slope	1.00	Slope	0.96	Slope	1.00
						Droughty	1.00
						Depth to bedrock	1.00
						Gravel content	0.05
Rhone	20	Very limited:		Somewhat limited:		Very limited:	
		Slope	1.00	Slope	0.96	Slope	1.00
57:							
Parachute	55	Somewhat limited:		Not limited		Very limited:	
		Slope	0.18			Slope	1.00
						Droughty	0.65
						Depth to bedrock	0.42
Rhone	35	Somewhat limited:		Not limited		Very limited:	
		Slope	0.18			Slope	1.00

Table 8b.--Recreation--Continued

Map symbol and soil name	Pct. of map unit	Paths and trails		Off-road motorcycle trails		Golf fairways	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
58:							
Peninsula	80	Not limited		Not limited		Somewhat limited:	
						Content of large stones	0.01
59:							
Persayo	85	Not limited		Not limited		Very limited:	
						Depth to bedrock	1.00
						Droughty	0.99
						Slope	0.96
						Salinity	0.01
60:							
Redcreek	60	Somewhat limited:		Not limited		Very limited:	
		Slope	0.18			Droughty	1.00
						Depth to bedrock	1.00
						Slope	1.00
Rentsac	30	Somewhat limited:		Somewhat limited:		Very limited:	
		Slope	0.92	Dusty	0.50	Droughty	1.00
		Dusty	0.50			Depth to bedrock	1.00
						Slope	1.00
						Gravel content	0.08
						Content of large stones	0.03
61:							
Rock outcrop	65	Not rated		Not rated		Not rated	
Torriorthents	30	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Dusty	0.50	Dusty	0.50	Droughty	1.00
						Depth to bedrock	1.00
						Content of large stones	0.20
						Gravel content	0.09
62:							
Shawa	85	Not limited		Not limited		Somewhat limited:	
						Slope	0.63
63:							
Silas	85	Not limited		Not limited		Not limited	
64:							
Torrifluvents	40	Somewhat limited:		Somewhat limited:		Somewhat limited:	
		Dusty	0.50	Dusty	0.50	Flooding	0.60
Gullied land	40	Not rated		Not rated		Not rated	
65:							
Torriorthents	50	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Dusty	0.50	Dusty	0.50	Droughty	1.00
						Depth to bedrock	1.00
						Content of large stones	0.20
						Gravel content	0.09
Rock outcrop	40	Not rated		Not rated		Not rated	

Table 8b.--Recreation--Continued

Map symbol and soil name	Pct. of map unit	Paths and trails: Rating class and limiting features	Value	Off-road motorcycle trails: Rating class and limiting features	Value	Golf fairways: Rating class and limiting features	Value
66:							
Torriorthents	50	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Dusty	0.50	Dusty	0.50	Droughty	1.00
						Depth to bedrock	1.00
						Content of large stones	0.20
						Gravel content	0.09
Rock outcrop	40	Not rated		Not rated		Not rated	
67:							
Tosca	80	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
						Gravel content	0.68
						Droughty	0.13
68:							
Trail	90	Somewhat limited:		Somewhat limited:		Somewhat limited:	
		Too sandy	0.28	Too sandy	0.28	Droughty	0.02
69:							
Travessilla	45	Somewhat limited:		Not limited		Very limited:	
		Slope	0.92			Droughty	1.00
						Depth to bedrock	1.00
						Slope	1.00
Rock outcrop	40	Not rated		Not rated		Not rated	
70:							
Uffens	85	Somewhat limited:		Somewhat limited:		Very limited:	
		Dusty	0.50	Dusty	0.50	Sodium content	1.00
71:							
Utso	60	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
						Gravel content	0.32
						Droughty	0.22
Rock outcrop	25	Not rated		Not rated		Not rated	
72:							
Wesdy	70	Somewhat limited:		Somewhat limited:		Very limited:	
		Content of large stones	0.14	Content of large stones	0.14	Content of large stones	1.00
		Slope	0.08			Slope	1.00
73:							
Wesdy	45	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Content of large stones	0.14	Content of large stones	0.14	Content of large stones	1.00
Northwater	40	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00

Table 8b.--Recreation--Continued

Map symbol and soil name	Pct. of map unit	Paths and trails: Rating class and limiting features	Value	Off-road motorcycle trails: Rating class and limiting features	Value	Golf fairways: Rating class and limiting features	Value
74:							
Winnemucca	60	Not limited		Not limited		Not limited	
Castino	30	Not limited		Not limited		Somewhat limited:	
						Depth to bedrock	0.42
75:							
Wrayha	35	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
						Gravel content	0.20
						Content of large stones	0.01
Rabbitex	20	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
Veatch	20	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
						Droughty	0.55
						Depth to bedrock	0.42
76:							
Wrayha	45	Very limited:		Somewhat limited:		Very limited:	
		Slope	1.00	Slope	0.14	Slope	1.00
						Gravel content	0.20
						Content of large stones	0.01
Veatch	25	Very limited:		Somewhat limited:		Very limited:	
		Slope	1.00	Slope	0.14	Slope	1.00
						Droughty	0.55
						Depth to bedrock	0.42
Rabbitex	20	Very limited:		Somewhat limited:		Very limited:	
		Slope	1.00	Slope	0.14	Slope	1.00
77:							
Yamo	55	Not limited		Not limited		Somewhat limited:	
						Slope	0.96
Redcreek	35	Not limited		Not limited		Very limited:	
						Droughty	1.00
						Depth to bedrock	1.00
						Slope	0.96
78:							
Youngston	90	Somewhat limited:		Somewhat limited:		Not limited	
		Dusty	0.50	Dusty	0.50		
79:							
Water	100	Not rated		Not rated		Not rated	

Wildlife Habitat

Wildlife is one of the most important resources in the survey area. The soils support habitat types ranging from sagebrush steppes to subalpine woodlands. Game species in the survey area include elk, mule deer, pronghorn, black bear, Rocky Mountain bighorn sheep, cottontail rabbit, blue grouse, sage grouse, mourning dove, Canada goose, mallard, and various other waterfowl species. Important predators in the area include mountain lion, coyote, badger, bobcat, gray fox, striped skunk, mink, long-tailed weasel, raccoon, bald eagle, golden eagle, red-tailed hawk, American kestrel, ferriginous hawk, Cooper's hawk, sharp-shinned hawk, prairie falcon, great horned owl, and midget-faced prairie rattlesnake.

Nongame species in the survey area include several species of hummingbirds, many species of native songbirds, white-tailed jackrabbit, raven, magpie, and turkey vulture. Rodents include beaver, muskrat, yellow-bellied marmot, porcupine, white-tailed prairie dog, several species of ground squirrel, rock squirrel, chipmunk, and mice.

The Colorado River and many streams and lakes in the survey area provide habitat for a variety of sport fish, including rainbow trout, brook trout, brown trout, native cutthroat, and channel catfish.

The survey area has habitat or potential habitat for many species that are classified as threatened and/or endangered, according to State and Federal lists. These species include peregrine falcon, greater sandhill crane, black-footed ferret, whooping crane, Colorado squaw-fish, razorback sucker, humpback chub, and bonytail chub.

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

In table 9, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flooding. Soil temperature and soil moisture also are considerations. Examples of grain and seed crops are corn, wheat, oats, and barley.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flooding, and slope. Soil temperature and soil moisture also are considerations. Examples of grasses and legumes are fescue, orchardgrass, bromegrass, clover, and alfalfa.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flooding. Soil temperature and soil moisture also are considerations. Examples of wild herbaceous plants are annual mustards, cheatgrass, balsamroot, wheatgrasses, needlegrasses, and annual flowers.

Coniferous plants furnish browse and seeds. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine, spruce, fir, and juniper.

Shrubs are bushy woody plants that produce fruit, buds, twigs, bark, and foliage. Soil properties and features that affect the growth of shrubs are depth of

the root zone, available water capacity, salinity, and soil moisture. Examples of shrubs are mountain mahogany, bitterbrush, snowberry, big sagebrush, saltbush, greasewood, and Gambel's oak.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, willow, saltgrass, rushes, sedges, and cattails.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. Wildlife attracted to these areas include pheasant, meadowlark, horned lark, cottontail, white-tailed jackrabbit, and coyote.

Habitat for woodland wildlife consists of areas of deciduous and/or coniferous plants and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include elk, mule deer, blue grouse, chickadees, juncos, woodpeckers, squirrels, bear, marten, and snowshoe hare.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, herons, shore birds, muskrat, mink, and beaver.

Habitat for rangeland wildlife consists of areas of shrubs and wild herbaceous plants. Wildlife attracted to rangeland include mule deer, sage grouse, meadowlark, horned lark, coyote, badger, bobcat, chukar, white-tailed jackrabbit, cottontail, and various raptors.

Table 9.--Wildlife Habitat

(See text for definitions of terms used in this table. Absence of an entry indicates that no rating is applicable.)

Map symbol and soil name	Potential for habitat elements							Potential as habitat for--			
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife	Rangeland wildlife
1:											
Aga	Very poor.	Very poor.	Good	---	Poor	Poor	Good	Poor	---	Fair	Fair.
2:											
Badland	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
3:											
Barx	Poor	Fair	Fair	---	Fair	Very poor.	Very poor.	Fair	---	Very poor.	Fair.
4:											
Barx	Poor	Fair	Fair	---	Fair	Very poor.	Very poor.	Fair	---	Very poor.	Fair.
Clapper	Very poor.	Very poor.	Fair	Poor	Fair	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Fair.
5:											
Battlement	Fair	Fair	Fair	---	Fair	Poor	Very poor.	Fair	---	Very poor.	Fair.

Table 9.--Wildlife Habitat--Continued

Map symbol and soil name	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife	Rangeland wildlife
6:											
Battlement	Poor	Poor	Poor	---	Fair	Poor	Very poor.	Poor	---	Very poor.	Poor.
7:											
Biedsaw	Very poor.	Very poor.	Fair	Poor	Fair	Very poor.	Very poor.	Poor	Poor	Very poor.	Fair.
Sunup	Very poor.	Very poor.	Fair	Very poor.	Fair	Very poor.	Very poor.	Poor	Very poor.	Very poor.	Fair.
8:											
Billings	Very poor.	Very poor.	Very poor.	---	Poor	Poor	Very poor.	Very poor.	---	Very poor.	Poor.
9:											
Bookcliff	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	---	Very poor.	Good.
Utso	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	---	Very poor.	Good.
10:											
Borollic Calciorthids	Very poor.	Very poor.	Fair	Poor	Fair	Very poor.	Very poor.	Poor	---	Very poor.	Fair.
11:											
Borpark	Very poor.	Very poor.	Good	---	Good	Very poor.	Very poor.	Poor	---	Very poor.	Good.
12:											
Bunkwater	Very poor.	Very poor.	Poor	---	Fair	Poor	Very poor.	Very poor.	---	Very poor.	Poor.
13:											
Caballo	Very poor.	Very poor.	Fair	Poor	Fair	Very poor.	Very poor.	Poor	Poor	Very poor.	Fair.
14:											
Callings	Poor	Poor	Good	Good	Fair	Poor	Very poor.	Fair	Good	Very poor.	Fair.
15:											
Cameo	Poor	Poor	Fair	---	Fair	Very poor.	Very poor.	Poor	---	Poor	Fair.
16:											
Castino	Poor	Poor	Good	Good	Fair	Poor	Very poor.	Fair	---	Very poor.	Fair.
Skisams	Poor	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.	Fair.
Winnemucca	Poor	Poor	Good	Good	Fair	Poor	Very poor.	Fair	Good	Very poor.	Fair.
17:											
Cathedral	Very poor.	Very poor.	Fair	---	Good	Very poor.	Very poor.	Poor	---	Very poor.	Fair.
Veatch	Poor	Fair	Good	---	Good	Very poor.	Very poor.	Poor	---	Very poor.	Good.

Table 9.--Wildlife Habitat--Continued

Map symbol and soil name	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife	Rangeland wildlife
18:											
Cerro	Poor	Poor	Good	---	Good	Very poor.	Very poor.	Fair	---	Very poor.	Good.
19:											
Cerro	Poor	Poor	Good	---	Good	Very poor.	Very poor.	Fair	---	Very poor.	Good.
20:											
Cerro	Poor	Poor	Good	---	Good	Very poor.	Very poor.	Fair	---	Very poor.	Good.
21:											
Chipeta	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
22:											
Clapper	Very poor.	Very poor.	Fair	Poor	Fair	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Fair.
23:											
Clapper	Very poor.	Very poor.	Fair	Poor	Fair	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Fair.
24:											
Cochetopa	Poor	Poor	Good	---	Fair	Very poor.	Very poor.	Fair	---	Very poor.	Fair.
Clayburn	Poor	Poor	Good	Good	Fair	Very poor.	Very poor.	Fair	Good	Very poor.	Fair.
25:											
Cowestglen	Poor	Fair	Fair	---	Fair	Very poor.	Very poor.	Fair	---	Very poor.	Fair.
26:											
Cryochrepts	Very poor.	Very poor.	Fair	Poor	Fair	Very poor.	Very poor.	Poor	Poor	Very poor.	Fair.
Cryoborolls	Very poor.	Very poor.	Fair	Poor	Fair	Very poor.	Very poor.	Poor	Poor	Very poor.	Fair.
Rubble land	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
27:											
Cryorthents	Very poor.	Very poor.	Good	Poor	---	Very poor.	Very poor.	Poor	Poor	Very poor.	---
Rock outcrop	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
28:											
Cumulic Haploborolls	Poor	Fair	Good	---	Good	Poor	Very poor.	Fair	---	Very poor.	Good.
29:											
Debeque	Poor	Poor	Fair	---	Good	Very poor.	Very poor.	Poor	---	Very poor.	Fair.
30:											
Debeque	Poor	Poor	Fair	---	Good	Very poor.	Very poor.	Poor	---	Very poor.	Fair.

Table 9.--Wildlife Habitat--Continued

Map symbol and soil name	Potential for habitat elements							Potential as habitat for--			
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife	Rangeland wildlife
30:											
Hesperus	Poor	Fair	Good	---	Good	Very poor.	Very poor.	Fair	---	Very poor.	Good.
31:											
Dominguez	Poor	Poor	Fair	---	Fair	Poor	Very poor.	Poor	---	Very poor.	Fair.
32:											
Dominguez	Poor	Poor	Fair	---	Fair	Poor	Very poor.	Poor	---	Very poor.	Fair.
33:											
Emmons	Poor	Poor	Fair	Fair	Good	Very poor.	Very poor.	Fair	Fair	Very poor.	Fair.
Cerro	Poor	Poor	Good	---	Good	Very poor.	Very poor.	Fair	---	Very poor.	Good.
Pagoda	Poor	Fair	Good	---	Good	Very poor.	Very poor.	Fair	---	Very poor.	Good.
34:											
Empedrado	Very poor.	Very poor.	Fair	---	Fair	Very poor.	Very poor.	Poor	---	Very poor.	Fair.
35:											
Empedrado	Poor	Poor	Fair	---	Fair	Very poor.	Very poor.	Fair	---	Very poor.	Fair.
Pagoda	Poor	Fair	Good	---	Good	Very poor.	Very poor.	Fair	---	Very poor.	Good.
Godding	Poor	Poor	Fair	---	---	Very poor.	Very poor.	Poor	---	Very poor.	Good.
36:											
Fluvaquents	Poor	Poor	Fair	Poor	Good	Good	Poor	Poor	---	Good	Fair.
37:											
Fughes	Fair	Fair	Good	---	Good	Very poor.	Very poor.	Fair	---	Very poor.	Good.
38:											
Fughes	Fair	Fair	Good	---	Good	Very poor.	Very poor.	Fair	---	Very poor.	Good.
39:											
Fughes	Fair	Fair	Good	---	Good	Very poor.	Very poor.	Fair	---	Very poor.	Good.
Hesperus	Fair	Fair	Good	---	Good	Poor	Very poor.	Fair	---	Very poor.	Good.
40:											
Godding	Poor	Poor	Fair	---	---	Very poor.	Very poor.	Poor	---	Very poor.	Good.
41:											
Golime	Very poor.	Poor	Good	---	Good	Poor	Very poor.	Poor	---	Very poor.	Good.

Table 9.--Wildlife Habitat--Continued

Map symbol and soil name	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife	Rangeland wildlife
42:											
Grobutte	Very poor.	Very poor.	Fair	---	Fair	Very poor.	Very poor.	Poor	---	Very poor.	Fair.
43:											
Haploborolls	Very poor.	Very poor.	Good	Fair	Good	Very poor.	Very poor.	Poor	---	Very poor.	Good.
Rock outcrop	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
44:											
Happle	Poor	Fair	Fair	Poor	Poor	Very poor.	Very poor.	Fair	---	Very poor.	Fair.
45:											
Happle	Poor	Fair	Fair	Poor	Poor	Very poor.	Very poor.	Fair	---	Very poor.	Fair.
46:											
Happle	Very poor.	Very poor.	Fair	Poor	Poor	Very poor.	Very poor.	Poor	---	Very poor.	Fair.
Rock outcrop	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
47:											
Hesperus	Poor	Fair	Good	---	Good	Very poor.	Very poor.	Fair	---	Very poor.	Good.
Empedrado	Poor	Poor	Fair	---	Fair	Very poor.	Very poor.	Fair	---	Very poor.	Fair.
Pagoda	Poor	Fair	Good	---	Good	Very poor.	Very poor.	Fair	---	Very poor.	Good.
48:											
Hesperus	Poor	Fair	Good	---	Good	Very poor.	Very poor.	Fair	---	Very poor.	Good.
Empedrado	Very poor.	Very poor.	Fair	---	Fair	Very poor.	Very poor.	Poor	---	Very poor.	Fair.
Pagoda	Poor	Fair	Good	---	Good	Very poor.	Very poor.	Fair	---	Very poor.	Good.
49:											
Hesperus	Fair	Fair	Good	---	Good	Poor	Very poor.	Fair	---	Very poor.	Good.
Pagoda	Fair	Fair	Good	---	Good	Poor	Very poor.	Fair	---	Very poor.	Good.
50:											
Irigul	Poor	Poor	Fair	---	Fair	Very poor.	Very poor.	Poor	---	Very poor.	Fair.
Starman	Very poor.	Very poor.	Poor	---	Poor	Very poor.	Very poor.	Very poor.	---	Very poor.	Poor.

Table 9.--Wildlife Habitat--Continued

Map symbol and soil name	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife	Rangeland wildlife
51:											
Mesa	Very poor.	Very poor.	Poor	---	Poor	Poor	Very poor.	Poor	---	Very poor.	Poor.
Avalon	Very poor.	Very poor.	Poor	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
52:											
Northwater	Very poor.	Very poor.	Good	---	Good	Very poor.	Very poor.	Very poor.	---	Very poor.	Good.
Adel	Very poor.	Very poor.	Good	---	Good	Very poor.	Very poor.	Poor	---	Very poor.	Good.
53:											
Pagoda	Poor	Fair	Good	---	Good	Very poor.	Very poor.	Fair	---	Very poor.	Good.
Hesperus	Poor	Fair	Good	---	Good	Very poor.	Very poor.	Fair	---	Very poor.	Good.
54:											
Panitchen	Fair	Fair	Very poor.	---	Good	Poor	Very poor.	Poor	---	Very poor.	Poor.
55:											
Parachute	Poor	Poor	Good	---	Fair	Very poor.	Very poor.	Fair	---	Very poor.	Fair.
Irigul	Poor	Poor	Fair	---	Fair	Very poor.	Very poor.	Poor	---	Very poor.	Fair.
56:											
Parachute	Very poor.	Very poor.	Good	---	Fair	Very poor.	Very poor.	Poor	---	Very poor.	Fair.
Irigul	Poor	Poor	Fair	---	Fair	Very poor.	Very poor.	Poor	---	Very poor.	Fair.
Rhone	Very poor.	Very poor.	Good	---	Fair	Very poor.	Very poor.	Poor	---	Very poor.	Good.
57:											
Parachute	Poor	Poor	Good	---	Fair	Very poor.	Very poor.	Fair	---	Very poor.	Fair.
Rhone	Poor	Poor	Good	---	Fair	Very poor.	Very poor.	Fair	---	Very poor.	Good.
58:											
Peninsula	Fair	Fair	Good	---	Good	Poor	Very poor.	Fair	---	Very poor.	Good.
59:											
Persayo	Very poor.	Very poor.	Poor	---	Poor	Very poor.	Very poor.	Very poor.	---	Very poor.	Poor.
60:											
Redcreek	Very poor.	Very poor.	Fair	---	Fair	Very poor.	Very poor.	Poor	---	Very poor.	Fair.
Rentsac	Poor	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Poor	Very poor.	Fair.

Table 9.--Wildlife Habitat--Continued

Map symbol and soil name	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife	Rangeland wildlife
61:											
Rock outcrop	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
Torriorthents	Very poor.	Very poor.	Poor	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
62:											
Shawa	Poor	Fair	Fair	---	Fair	Very poor.	Very poor.	Fair	---	Very poor.	Fair.
63:											
Silas	Poor	Poor	Good	---	Fair	Poor	Very poor.	Fair	---	Very poor.	Fair.
64:											
Torrifluvents	Very poor.	Very poor.	Poor	---	Fair	Very poor.	Very poor.	Very poor.	---	Very poor.	Poor.
Gullied land	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Good	Very poor.	Very poor.	Fair	Very poor.
65:											
Torriorthents	Very poor.	Very poor.	Poor	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
Rock outcrop	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
66:											
Torriorthents	Very poor.	Very poor.	Poor	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Poor.
Rock outcrop	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
67:											
Tosca	Very poor.	Very poor.	Good	---	Good	Very poor.	Very poor.	Poor	---	Very poor.	Good.
68:											
Trail	Very poor.	Very poor.	Poor	---	Fair	Very poor.	Very poor.	Very poor.	---	Very poor.	Poor.
69:											
Travessilla	Poor	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.	Fair.
Rock outcrop	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
70:											
Uffens	Very poor.	Very poor.	Very poor.	---	Poor	Poor	Very poor.	Very poor.	---	Very poor.	Very poor.
71:											
Utso	Very poor.	Very poor.	Fair	Poor	Good	Very poor.	Very poor.	Poor	Poor	Very poor.	Fair.
Rock outcrop	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.

Table 9.--Wildlife Habitat--Continued

Map symbol and soil name	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife	Rangeland wildlife
72:											
Wesdy-------------------	Poor	Poor	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.	Fair.
73:											
Wesdy-------------------	Very poor.	Very poor.	Good	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.	Fair.
Northwater--------------	Very poor.	Very poor.	Good	---	Good	Very poor.	Very poor.	Very poor.	---	Very poor.	Good.
74:											
Winnemucca--------------	Poor	Poor	Good	Good	Fair	Poor	Very poor.	Fair	Good	Very poor.	Fair.
Castino-----------------	Poor	Poor	Good	Good	Fair	Poor	Very poor.	Fair	---	Very poor.	Fair.
75:											
Wrayha------------------	Very poor.	Very poor.	Fair	Fair	Good	Very poor.	Very poor.	Poor	Poor	Very poor.	Fair.
Rabbitex----------------	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.	Good.
Veatch------------------	Poor	Fair	Good	---	Good	Very poor.	Very poor.	Poor	---	Very poor.	Good.
76:											
Wrayha------------------	Very poor.	Very poor.	Fair	Fair	Good	Very poor.	Very poor.	Poor	Poor	Very poor.	Fair.
Veatch------------------	Poor	Fair	Good	---	Good	Very poor.	Very poor.	Poor	---	Very poor.	Good.
Rabbitex----------------	Very poor.	Very poor.	Good	Good	Good	Very poor.	Very poor.	Poor	Fair	Very poor.	Good.
77:											
Yamo--------------------	Very poor.	Fair	Good	---	Fair	Very poor.	Very poor.	Fair	---	Very poor.	Fair.
Redcreek----------------	Very poor.	Very poor.	Fair	---	Fair	Very poor.	Very poor.	Poor	---	Very poor.	Fair.
78:											
Youngston---------------	Very poor.	Very poor.	Poor	---	Poor	Poor	Very poor.	Very poor.	---	Very poor.	Poor.
79:											
Water.											

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. Ratings are given for building site development, sanitary facilities, construction materials, and water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil between the surface and a depth of 5 to 7 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations should be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about particle-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 to 7 feet of the surface, soil wetness, depth to a water table, ponding, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kinds of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to evaluate the potential of areas for residential, commercial, industrial, and recreational uses; make preliminary estimates of construction conditions; evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; plan detailed onsite investigations of soils and geology; locate potential sources of gravel, sand, earthfill, and topsoil; plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

Building Site Development

Soil properties influence the development of building sites, including the selection of the site, the design of the structure, construction, performance after construction, and maintenance. Table 10a and table 10b show the degree and kind of soil limitations that affect dwellings with and without basements, small commercial buildings, local roads and streets, shallow excavations, and lawns and landscaping.

The ratings in the tables are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect building site development. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the tables indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.00 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

Dwellings are single-family houses of three stories or less. For dwellings without basements, the foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of 2 feet or at the depth of maximum frost penetration,

whichever is deeper. For dwellings with basements, the foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of about 7 feet. The ratings for dwellings are based on the soil properties that affect the capacity of the soil to support a load without movement and on the properties that affect excavation and construction costs. The properties that affect the load-supporting capacity include depth to a water table, ponding, flooding, subsidence, linear extensibility (shrink-swell potential), and compressibility. Compressibility is inferred from the Unified classification. The properties that affect the ease and amount of excavation include depth to a water table, ponding, flooding, slope, depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, and the amount and size of rock fragments.

Small commercial buildings are structures that are less than three stories high and do not have basements. The foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of 2 feet or at the depth of maximum frost penetration, whichever is deeper. The ratings are based on the soil properties that affect the capacity of the soil to support a load without movement and on the properties that affect excavation and construction costs. The properties that affect the load-supporting capacity include depth to a water table, ponding, flooding, subsidence, linear extensibility (shrink-swell potential), and compressibility (which is inferred from the Unified classification). The properties that affect the ease and amount of excavation include flooding, depth to a water table, ponding, slope, depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, and the amount and size of rock fragments.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material; a base of gravel, crushed rock, or soil material stabilized by lime or cement; and a surface of flexible material (asphalt), rigid material (concrete), or gravel with a binder. The ratings are based on the soil properties that affect the ease of excavation and grading and the traffic-supporting capacity. The properties that affect the ease of excavation and grading are depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, depth to a water table, ponding, flooding, the amount of large stones, and slope. The properties that affect the traffic-supporting capacity are soil strength (as inferred from the AASHTO group index number), subsidence, linear extensibility (shrink-swell potential), the potential for frost action, depth to a water table, and ponding.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for graves, utility lines, open ditches, or other purposes. The ratings are based on the soil properties that influence the ease of digging and the resistance to sloughing. Depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, the amount of large stones, and dense layers influence the ease of digging, filling, and compacting. Depth to the seasonal high water table, flooding, and ponding may restrict the period when excavations can be made. Slope influences the ease of using machinery. Soil texture, depth to the water table, and linear extensibility (shrink-swell potential) influence the resistance to sloughing.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. Irrigation is not considered in the ratings. The ratings are based on the soil properties that affect plant growth and trafficability after vegetation is established. The properties that affect plant growth are reaction; depth to a water table; ponding; depth to bedrock or a cemented pan; the available water capacity in the upper 40 inches; the content of salts, sodium, or calcium carbonate; and sulfidic materials. The properties that affect trafficability are flooding, depth to a water table, ponding, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer.

Sanitary Facilities

Table 11a and table 11b show the degree and kind of soil limitations that affect septic tank absorption fields, sewage lagoons, sanitary landfills, and daily cover for landfill. The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect these uses. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the tables indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.00 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 60 inches is evaluated. The ratings are based on the soil properties that affect absorption of the effluent, construction and maintenance of the system, and public health. Permeability, depth to a water table, ponding, depth to bedrock or a cemented pan, and flooding affect absorption of the effluent. Stones and boulders, ice, and bedrock or a cemented pan interfere with installation. Subsidence interferes with installation and maintenance. Excessive slope may cause lateral seepage and surfacing of the effluent in downslope areas.

Some soils are underlain by loose sand and gravel or fractured bedrock at a depth of less than 4 feet below the distribution lines. In these soils the absorption field may not adequately filter the effluent, particularly when the system is new. As a result, the ground water may become contaminated.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water. Considered in the ratings are slope, permeability, depth to a water table, ponding, depth to bedrock or a cemented pan, flooding, large stones, and content of organic matter.

Soil permeability is a critical property affecting the suitability for sewage lagoons. Most porous soils eventually become sealed when they are used as sites for sewage lagoons. Until sealing occurs, however, the hazard of pollution is severe. Soils that have a permeability rate of more than 2 inches per hour are too porous for the proper functioning of sewage lagoons. In these soils, seepage of the effluent can result in contamination of the ground water. Ground-water contamination is also a hazard if fractured bedrock is within a depth of 40 inches, if the water table is high enough to raise the level of sewage in the lagoon, or if floodwater overtops the lagoon.

A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor. If the lagoon is to be uniformly deep throughout, the slope must be gentle enough and the soil material must be thick enough over bedrock or a cemented pan to make land smoothing practical.

A *trench sanitary landfill* is an area where solid waste is placed in successive layers in an excavated trench. The waste is spread, compacted, and covered daily with a thin layer of soil excavated at the site. When the trench is full, a final cover of soil material at least 2 feet thick is placed over the landfill. The ratings in the table are based on the soil properties that affect the risk of pollution, the ease of excavation, trafficability, and revegetation. These properties include permeability, depth to bedrock or a cemented pan, depth to a water table, ponding, slope, flooding, texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, onsite investigation may be needed.

Hard, nonrippable bedrock, creviced bedrock, or highly permeable strata in or directly below the proposed trench bottom can affect the ease of excavation and the hazard of ground-water pollution. Slope affects construction of the trenches and the movement of surface water around the landfill. It also affects the construction and performance of roads in areas of the landfill.

Soil texture and consistence affect the ease with which the trench is dug and the ease with which the soil can be used as daily or final cover. They determine the workability of the soil when dry and when wet. Soils that are plastic and sticky when wet are difficult to excavate, grade, or compact and are difficult to place as a uniformly thick cover over a layer of refuse.

The soil material used as the final cover for a trench landfill should be suitable for plants. It should not have excess sodium or salts and should not be too acid. The surface layer generally has the best workability, the highest content of organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

In an *area sanitary landfill*, solid waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site. A final cover of soil material at least 2 feet thick is placed over the completed landfill. The ratings in the table are based on the soil properties that affect trafficability and the risk of pollution. These properties include flooding,

permeability, depth to a water table, ponding, slope, and depth to bedrock or a cemented pan.

Flooding is a serious problem because it can result in pollution in areas downstream from the landfill. If permeability is too rapid or if fractured bedrock, a fractured cemented pan, or the water table is close to the surface, the leachate can contaminate the water supply. Slope is a consideration because of the extra grading required to maintain roads in the steeper areas of the landfill. Also, leachate may flow along the surface of the soils in the steeper areas and cause difficult seepage problems.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste. The ratings in the table also apply to the final cover for a landfill. They are based on the soil properties that affect workability, the ease of digging, and the ease of moving and spreading the material over the refuse daily during wet and dry periods. These properties include soil texture, depth to a water table, ponding, rock fragments, slope, depth to bedrock or a cemented pan, reaction, and content of salts, sodium, or lime.

Loamy or silty soils that are free of large stones and excess gravel are the best cover for a landfill. Clayey soils may be sticky and difficult to spread; sandy soils are subject to wind erosion.

Slope affects the ease of excavation and of moving the cover material. Also, it can influence runoff, erosion, and reclamation of the borrow area.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as the final cover for a landfill should be suitable for plants. It should not have excess sodium, salts, or lime and should not be too acid.

Construction Materials

Table 12a and table 12b give information about the soils as potential sources of gravel, sand, topsoil, reclamation material, and roadfill. Normal compaction, minor processing, and other standard construction practices are assumed.

Sand and *gravel* are natural aggregates suitable for commercial use with a minimum of processing. They are used in many kinds of construction. Specifications for each use vary widely. In table 12a, only the likelihood of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material. The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the Unified classification of the soil), the thickness of suitable material, and the content of rock fragments. If the bottom layer of the soil contains sand or gravel, the soil is considered a likely source regardless of thickness. The assumption is that the sand or gravel layer below the depth of observation exceeds the minimum thickness.

The soils are rated as *probable* or *improbable* sources of sand and gravel. A rating of *probable* means that the source material is likely to be in or below the soil. The bottom layer and the thickest layer of the soils are assigned numerical ratings. These ratings indicate the likelihood that the layer is a source of sand or gravel. The number 0.00 indicates that the layer is an unlikely source. A number between 0.00 and 1.00 indicates the degree to which the layer is a likely source.

The soils are rated *good, fair,* or *poor* as potential sources of topsoil, reclamation material, and roadfill. The features that limit the soils as sources of these materials are specified in the tables. The numerical ratings given after the specified features indicate the degree to which the features limit the soils as sources of topsoil, reclamation material, or roadfill. The lower the number, the greater the limitation.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area. The ratings are based on the soil properties that affect plant growth; the ease of excavating, loading, and spreading the material; and reclamation of the borrow area. Toxic substances, soil reaction, and the properties that are inferred from soil texture, such as available water capacity and fertility, affect plant growth. The ease of excavating, loading, and spreading is affected by rock fragments, slope, depth to a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, depth to a water table, rock fragments, depth to bedrock or a cemented pan, and toxic material.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Reclamation material is used in areas that have been drastically disturbed by surface mining or similar activities. When these areas are reclaimed, layers of soil material or unconsolidated geological material, or both, are replaced in a vertical sequence. The reconstructed soil favors plant growth. The ratings in

the table do not apply to quarries and other mined areas that require an offsite source of reconstruction material. The ratings are based on the soil properties that affect erosion and stability of the surface and the productive potential of the reconstructed soil. These properties include the content of sodium, salts, and calcium carbonate; reaction; available water capacity; erodibility; texture; content of rock fragments; and content of organic matter and other features that affect fertility.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the whole soil, from the surface to a depth of about 5 feet. It is assumed that soil layers will be mixed when the soil material is excavated and spread.

The ratings are based on the amount of suitable material and on soil properties that affect the ease of excavation and the performance of the material after it is in place. The thickness of the suitable material is a major consideration. The ease of excavation is affected by large stones, depth to a water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the AASHTO classification of the soil) and linear extensibility (shrink-swell potential).

Water Management

Table 13 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas; embankments, dikes, and levees; and aquifer-fed excavated ponds. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives for each soil the restrictive features that affect drainage, irrigation, terraces and diversions, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Aquifer-fed excavated ponds are pits or dugouts that extend to a ground-water aquifer or to a depth below a permanent water table. Excluded are ponds that are fed only by surface runoff and embankment ponds that impound water 3 feet or more above the original surface. Excavated ponds are affected by depth to a permanent water table, permeability of the aquifer, and quality of the water as inferred from the salinity of the soil. Depth to bedrock and the content of large stones affect the ease of excavation.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, a cemented pan, or other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; subsidence of organic layers; and the potential for frost action. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or a cemented pan, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, and sulfur. Availability of drainage outlets is not considered in the ratings.

Irrigation is the controlled application of water to

supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The construction of a system is affected by large stones and depth to bedrock or a cemented pan. The performance of a system is affected by the depth of the root zone, the amount of salts or sodium, and soil reaction.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to control erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock or a cemented pan affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of wind erosion or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock or a cemented pan affect the construction of grassed waterways. A hazard of wind erosion, low available water capacity, restricted rooting depth, toxic substances such as salts and sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Table 10a.--Building Site Development

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the potential limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
1:							
Aga	85	Very limited:		Very limited:		Very limited:	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
				Depth to saturated zone	0.35		
2:							
Badland	80	Not rated		Not rated		Not rated	
3:							
Barx	85	Not limited		Not limited		Very limited:	
						Slope	1.00
4:							
Barx	60	Not limited		Not limited		Very limited:	
						Slope	1.00
Clapper	25	Somewhat limited:		Somewhat limited:		Very limited:	
		Content of large stones	0.62	Content of large stones	0.62	Slope	1.00
						Content of large stones	0.62
5:							
Battlement	90	Very limited:		Very limited:		Very limited:	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
						Slope	0.12
6:							
Battlement	90	Very limited:		Very limited:		Very limited:	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
						Slope	0.12

Table 10a.--Building Site Development--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements: Rating class and limiting features	Value	Dwellings with basements: Rating class and limiting features	Value	Small commercial buildings: Rating class and limiting features	Value
7:							
Biedsaw	45	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
Sunup	25	Very limited:		Very limited:		Very limited:	
		Depth to hard bedrock	1.00	Depth to hard bedrock	1.00	Slope	1.00
		Slope	1.00	Slope	1.00	Depth to hard bedrock	1.00
8:							
Billings	90	Somewhat limited:		Somewhat limited:		Somewhat limited:	
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
9:							
Bookcliff	45	Somewhat limited:		Somewhat limited:		Very limited:	
		Slope	0.96	Slope	0.96	Slope	1.00
Utso	40	Somewhat limited:		Somewhat limited:		Very limited:	
		Slope	0.96	Slope	0.96	Slope	1.00
10:							
Borollic Calciorthids	80	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
11:							
Borpark	70	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Content of large stones	0.90	Content of large stones	0.90	Content of large stones	0.90
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
12:							
Bunkwater	85	Not limited		Not limited		Somewhat limited:	
						Slope	0.12
13:							
Caballo	85	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Content of large stones	0.43	Content of large stones	0.43	Content of large stones	0.43
14:							
Callings	90	Somewhat limited:		Somewhat limited:		Somewhat limited:	
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
		Content of large stones	0.20	Content of large stones	0.20	Slope	0.47
						Content of large stones	0.20
15:							
Cameo	90	Very limited:		Very limited:		Very limited:	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
16:							
Castino	40	Somewhat limited:		Very limited:		Somewhat limited:	
		Depth to hard bedrock	0.42	Depth to hard bedrock	1.00	Slope	0.47
		Content of large stones	0.01	Content of large stones	0.01	Depth to hard bedrock	0.42
						Content of large stones	0.01

Table 10a.--Building Site Development--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements: Rating class and limiting features	Value	Dwellings with basements: Rating class and limiting features	Value	Small commercial buildings: Rating class and limiting features	Value
16:							
Skisams	25	Very limited:		Very limited:		Very limited:	
		Depth to hard bedrock	1.00	Depth to hard bedrock	1.00	Depth to hard bedrock	1.00
						Slope	0.47
Winnemucca	20	Not limited		Not limited		Somewhat limited:	
						Slope	0.47
17:							
Cathedral	40	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to hard bedrock	1.00	Depth to hard bedrock	1.00	Depth to hard bedrock	1.00
Veatch	40	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to hard bedrock	0.42	Depth to hard bedrock	1.00	Depth to hard bedrock	0.42
18:							
Cerro	80	Very limited:		Somewhat limited:		Very limited:	
		Shrink-swell	1.00	Shrink-swell	0.50	Shrink-swell	1.00
19:							
Cerro	70	Very limited:		Somewhat limited:		Very limited:	
		Shrink-swell	1.00	Shrink-swell	0.50	Shrink-swell	1.00
		Slope	0.04	Slope	0.04	Slope	1.00
20:							
Cerro	80	Very limited:		Very limited:		Very limited:	
		Shrink-swell	1.00	Slope	1.00	Slope	1.00
		Slope	1.00	Shrink-swell	0.50	Shrink-swell	1.00
21:							
Chipeta	85	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Depth to soft bedrock	1.00	Slope	1.00
		Depth to soft bedrock	1.00	Slope	1.00	Depth to soft bedrock	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
22:							
Clapper	85	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Content of large stones	0.62	Content of large stones	0.62	Content of large stones	0.62
23:							
Clapper	85	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Content of large stones	0.62	Content of large stones	0.62	Content of large stones	0.62
24:							
Cochetopa	50	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
Clayburn	20	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50

Table 10a.--Building Site Development--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements: Rating class and limiting features	Value	Dwellings with basements: Rating class and limiting features	Value	Small commercial buildings: Rating class and limiting features	Value
25:							
Cowestglen	90	Very limited:		Very limited:		Very limited:	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
						Slope	0.12
26:							
Cryochrepts	35	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Content of large stones	1.00	Content of large stones	1.00	Content of large stones	1.00
Cryoborolls	30	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Content of large stones	0.11	Depth to soft bedrock	1.00	Content of large stones	0.11
				Content of large stones	0.11		
Rubble land	25	Not rated		Not rated		Not rated	
27:							
Cryorthents	55	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
				Depth to soft bedrock	0.84		
Rock outcrop	30	Not rated		Not rated		Not rated	
28:							
Cumulic Haploborolls	90	Very limited:		Very limited:		Very limited:	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
				Depth to saturated zone	0.35		
29:							
Debeque	85	Somewhat limited:		Somewhat limited:		Very limited:	
		Slope	0.84	Slope	0.84	Slope	1.00
30:							
Debeque	40	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
Hesperus	35	Somewhat limited:		Somewhat limited:		Very limited:	
		Shrink-swell	0.50	Shrink-swell	0.50	Slope	1.00
		Slope	0.16	Slope	0.16	Shrink-swell	0.50
31:							
Dominguez	85	Very limited:		Very limited:		Very limited:	
		Shrink-swell	1.00	Shrink-swell	1.00	Shrink-swell	1.00
32:							
Dominguez	80	Very limited:		Very limited:		Very limited:	
		Shrink-swell	1.00	Shrink-swell	1.00	Shrink-swell	1.00
						Slope	0.47
33:							
Emmons	30	Somewhat limited:		Somewhat limited:		Very limited:	
		Slope	0.84	Slope	0.84	Slope	1.00

Table 10a.--Building Site Development--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements: Rating class and limiting features	Value	Dwellings with basements: Rating class and limiting features	Value	Small commercial buildings: Rating class and limiting features	Value
33:							
Cerro	25	Very limited:		Very limited:		Very limited:	
		Shrink-swell	1.00	Slope	1.00	Shrink-swell	1.00
		Slope	1.00	Shrink-swell	0.50	Slope	1.00
Pagoda	25	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
34:							
Empedrado	80	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
35:							
Empedrado	35	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
Pagoda	30	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
Godding	25	Very limited:		Very limited:		Very limited:	
		Content of large stones	1.00	Content of large stones	1.00	Content of large stones	1.00
		Slope	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	0.50			Shrink-swell	0.50
36:							
Fluvaquents	80	Very limited:		Very limited:		Very limited:	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		Depth to saturated zone	0.08	Depth to saturated zone	1.00	Depth to saturated zone	0.08
37:							
Fughes	90	Very limited:		Very limited:		Very limited:	
		Shrink-swell	1.00	Shrink-swell	1.00	Shrink-swell	1.00
38:							
Fughes	90	Very limited:		Very limited:		Very limited:	
		Shrink-swell	1.00	Shrink-swell	1.00	Shrink-swell	1.00
						Slope	0.47
39:							
Fughes	60	Very limited:		Very limited:		Very limited:	
		Shrink-swell	1.00	Shrink-swell	1.00	Shrink-swell	1.00
						Slope	1.00
Hesperus	25	Somewhat limited:		Somewhat limited:		Very limited:	
		Shrink-swell	0.50	Shrink-swell	0.50	Slope	1.00
						Shrink-swell	0.50
40:							
Godding	75	Very limited:		Very limited:		Very limited:	
		Content of large stones	1.00	Content of large stones	1.00	Slope	1.00
		Slope	1.00	Slope	1.00	Content of large stones	1.00
		Shrink-swell	0.50			Shrink-swell	0.50

Table 10a.--Building Site Development--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
41:							
Golime	80	Very limited:		Very limited:		Very limited:	
		Content of large stones	1.00	Content of large stones	1.00	Slope	1.00
		Slope	0.16	Slope	0.16	Content of large stones	1.00
42:							
Grobutte	90	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
43:							
Haploborolls	60	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Content of large stones	0.44	Depth to hard bedrock	1.00	Content of large stones	0.44
		Depth to hard bedrock	0.10	Content of large stones	0.44	Depth to hard bedrock	0.10
Rock outcrop	30	Not rated		Not rated		Not rated	
44:							
Happle	80	Not limited		Not limited		Very limited:	
						Slope	1.00
45:							
Happle	80	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
46:							
Happle	50	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
Rock outcrop	35	Not rated		Not rated		Not rated	
47:							
Hesperus	35	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
Empedrado	30	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
Pagoda	20	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
48:							
Hesperus	35	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
Empedrado	30	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
Pagoda	20	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50

Table 10a.--Building Site Development--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements: Rating class and limiting features	Value	Dwellings with basements: Rating class and limiting features	Value	Small commercial buildings: Rating class and limiting features	Value
49:							
Hesperus------------	45	Somewhat limited:		Somewhat limited:		Very limited:	
		Shrink-swell	0.50	Shrink-swell	0.50	Slope	1.00
						Shrink-swell	0.50
Pagoda--------------	40	Somewhat limited:		Somewhat limited:		Very limited:	
		Shrink-swell	0.50	Shrink-swell	0.50	Slope	1.00
						Shrink-swell	0.50
50:							
Irigul--------------	40	Very limited:		Very limited:		Very limited:	
		Depth to hard bedrock	1.00	Depth to hard bedrock	1.00	Depth to hard bedrock	1.00
		Slope	1.00	Slope	1.00	Slope	1.00
Starman-------------	30	Very limited:		Very limited:		Very limited:	
		Depth to hard bedrock	1.00	Depth to hard bedrock	1.00	Depth to hard bedrock	1.00
		Slope	1.00	Slope	1.00	Slope	1.00
51:							
Mesa----------------	50	Somewhat limited:		Not limited		Very limited:	
		Shrink-swell	0.50			Slope	1.00
						Shrink-swell	0.50
Avalon--------------	35	Not limited		Not limited		Very limited:	
						Slope	1.00
52:							
Northwater----------	50	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
Adel----------------	40	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
53:							
Pagoda--------------	50	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
Hesperus------------	20	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
54:							
Panitchen-----------	85	Not limited		Not limited		Not limited	
55:							
Parachute-----------	60	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
				Depth to soft bedrock	0.42		
Irigul--------------	30	Very limited:		Very limited:		Very limited:	
		Depth to hard bedrock	1.00	Depth to hard bedrock	1.00	Depth to hard bedrock	1.00
		Slope	1.00	Slope	1.00	Slope	1.00

Table 10a.--Building Site Development--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
56:							
Parachute	35	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
				Depth to soft bedrock	0.42		
Irigul	30	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to hard bedrock	1.00	Depth to hard bedrock	1.00	Depth to hard bedrock	1.00
Rhone	20	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
57:							
Parachute	55	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
				Depth to soft bedrock	0.42		
Rhone	35	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
58:							
Peninsula	80	Somewhat limited:		Not limited		Somewhat limited:	
		Shrink-swell	0.50			Shrink-swell	0.50
						Slope	0.47
59:							
Persayo	85	Somewhat limited:		Very limited:		Very limited:	
		Depth to soft bedrock	1.00	Depth to soft bedrock	1.00	Slope	1.00
		Slope	0.96	Slope	0.96	Depth to soft bedrock	1.00
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
60:							
Redcreek	60	Very limited:		Very limited:		Very limited:	
		Depth to hard bedrock	1.00	Depth to hard bedrock	1.00	Depth to hard bedrock	1.00
		Slope	1.00	Slope	1.00	Slope	1.00
Rentsac	30	Very limited:		Very limited:		Very limited:	
		Depth to hard bedrock	1.00	Depth to hard bedrock	1.00	Depth to hard bedrock	1.00
		Slope	1.00	Slope	1.00	Slope	1.00
61:							
Rock outcrop	65	Not rated		Not rated		Not rated	
Torriorthents	30	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to hard bedrock	1.00	Depth to hard bedrock	1.00	Depth to hard bedrock	1.00
62:							
Shawa	85	Somewhat limited:		Somewhat limited:		Very limited:	
		Slope	0.63	Slope	0.63	Slope	1.00

Table 10a.--Building Site Development--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements: Rating class and limiting features	Value	Dwellings with basements: Rating class and limiting features	Value	Small commercial buildings: Rating class and limiting features	Value
63:							
Silas	85	Very limited:		Very limited:		Very limited:	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
				Depth to saturated zone	0.24	Slope	0.86
64:							
Torrifluvents	40	Very limited:		Very limited:		Very limited:	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
Gullied land	40	Not rated		Not rated		Not rated	
65:							
Torriorthents	50	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to hard bedrock	1.00	Depth to hard bedrock	1.00	Depth to hard bedrock	1.00
Rock outcrop	40	Not rated		Not rated		Not rated	
66:							
Torriorthents	50	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to hard bedrock	1.00	Depth to hard bedrock	1.00	Depth to hard bedrock	1.00
Rock outcrop	40	Not rated		Not rated		Not rated	
67:							
Tosca	80	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
68:							
Trail	90	Very limited:		Very limited:		Very limited:	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
69:							
Travessilla	45	Very limited:		Very limited:		Very limited:	
		Depth to hard bedrock	1.00	Depth to hard bedrock	1.00	Slope	1.00
		Slope	1.00	Slope	1.00	Depth to hard bedrock	1.00
Rock outcrop	40	Not rated		Not rated		Not rated	
70:							
Uffens	85	Not limited		Not limited		Somewhat limited:	
						Slope	0.12
71:							
Utso	60	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
Rock outcrop	25	Not rated		Not rated		Not rated	
72:							
Wesdy	70	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Content of large stones	0.82	Content of large stones	0.82	Content of large stones	0.82
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50

Table 10a.--Building Site Development--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements: Rating class and limiting features	Value	Dwellings with basements: Rating class and limiting features	Value	Small commercial buildings: Rating class and limiting features	Value
73:							
Wesdy	45	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Content of large stones	0.82	Content of large stones	0.82	Content of large stones	0.82
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
Northwater	40	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
74:							
Winnemucca	60	Not limited		Not limited		Somewhat limited:	
						Slope	0.47
Castino	30	Somewhat limited:		Very limited:		Somewhat limited:	
		Depth to hard bedrock	0.42	Depth to hard bedrock	1.00	Slope	0.47
		Content of large stones	0.01	Content of large stones	0.01	Depth to hard bedrock	0.42
						Content of large stones	0.01
75:							
Wrayha	35	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	0.50	Shrink-swell	1.00	Shrink-swell	0.50
Rabbitex	20	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
Veatch	20	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to hard bedrock	0.42	Depth to hard bedrock	1.00	Depth to hard bedrock	0.42
76:							
Wrayha	45	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Shrink-swell	1.00	Slope	1.00
		Shrink-swell	0.50	Slope	1.00	Shrink-swell	0.50
Veatch	25	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Depth to hard bedrock	1.00	Slope	1.00
		Depth to hard bedrock	0.42	Slope	1.00	Depth to hard bedrock	0.42
Rabbitex	20	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
77:							
Yamo	55	Somewhat limited:		Somewhat limited:		Very limited:	
		Slope	0.96	Slope	0.96	Slope	1.00
Redcreek	35	Very limited:		Very limited:		Very limited:	
		Depth to hard bedrock	1.00	Depth to hard bedrock	1.00	Depth to hard bedrock	1.00
		Slope	0.96	Slope	0.96	Slope	1.00

Table 10a.--Building Site Development--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
78:							
Youngston-----------	90	Not limited		Not limited		Not limited	
79:							
Water---------------	100	Not rated		Not rated		Not rated	

Table 10b.--Building Site Development

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the potential limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct. of map unit	Local roads and streets: Rating class and limiting features	Value	Shallow excavations: Rating class and limiting features	Value	Lawns and landscaping: Rating class and limiting features	Value
1:							
Aga	85	Very limited:		Somewhat limited:		Somewhat limited:	
		Flooding	1.00	Flooding	0.60	Flooding	0.60
				Depth to saturated zone	0.35	Droughty	0.29
				Cutbanks cave	0.10		
2:							
Badland	80	Not rated		Not rated		Not rated	
3:							
Barx	85	Not limited		Somewhat limited:		Not limited	
				Cutbanks cave	0.10		
4:							
Barx	60	Not limited		Somewhat limited:		Not limited	
				Cutbanks cave	0.10		
Clapper	25	Somewhat limited:		Somewhat limited:		Very limited:	
		Content of large stones	0.62	Content of large stones	0.62	Content of large stones	1.00
				Cutbanks cave	0.10	Droughty	0.34
5:							
Battlement	90	Somewhat limited:		Somewhat limited:		Not limited	
		Flooding	0.40	Cutbanks cave	0.10		
6:							
Battlement	90	Somewhat limited:		Somewhat limited:		Not limited	
		Flooding	0.40	Cutbanks cave	0.10		
7:							
Biedsaw	45	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	0.50	Cutbanks cave	0.10	Gravel content	0.25
Sunup	25	Very limited:		Very limited:		Very limited:	
		Depth to hard bedrock	1.00	Depth to hard bedrock	1.00	Droughty	1.00
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
				Cutbanks cave	0.10	Slope	1.00
						Content of large stones	0.08
						Gravel content	0.06
8:							
Billings	90	Very limited:		Somewhat limited:		Somewhat limited:	
		Frost action	1.00	Cutbanks cave	0.10	Salinity	0.01
		Low strength	1.00				
		Shrink-swell	0.50				

Table 10b.--Building Site Development--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets: Rating class and limiting features	Value	Shallow excavations: Rating class and limiting features	Value	Lawns and landscaping: Rating class and limiting features	Value
9:							
Bookcliff-----------	45	Somewhat limited:		Somewhat limited:		Somewhat limited:	
		Slope	0.96	Slope	0.96	Slope	0.96
		Frost action	0.50	Cutbanks cave	0.10		
Utso----------------	40	Somewhat limited:		Somewhat limited:		Somewhat limited:	
		Slope	0.96	Slope	0.96	Slope	0.96
		Frost action	0.50	Cutbanks cave	0.10	Gravel content	0.32
						Droughty	0.22
10:							
Borollic Calciorthids-------	80	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
				Cutbanks cave	0.10		
11:							
Borpark-------------	70	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Content of large stones	0.90	Content of large stones	0.90	Content of large stones	1.00
		Shrink-swell	0.50	Cutbanks cave	0.10		
12:							
Bunkwater-----------	85	Not limited		Somewhat limited:		Very limited:	
				Cutbanks cave	0.10	Sodium content	1.00
13:							
Caballo-------------	85	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Content of large stones	0.43	Gravel content	0.98
		Content of large stones	0.43	Cutbanks cave	0.10	Droughty	0.85
						Content of large stones	0.20
14:							
Callings------------	90	Somewhat limited:		Somewhat limited:		Not limited	
		Shrink-swell	0.50	Content of large stones	0.20		
		Frost action	0.50	Too clayey	0.12		
		Content of large stones	0.20	Cutbanks cave	0.10		
15:							
Cameo---------------	90	Somewhat limited:		Somewhat limited:		Not limited	
		Frost action	0.50	Cutbanks cave	0.10		
		Flooding	0.40				
16:							
Castino-------------	40	Somewhat limited:		Very limited:		Somewhat limited:	
		Frost action	0.50	Depth to hard bedrock	1.00	Depth to bedrock	0.42
		Depth to hard bedrock	0.42	Too clayey	0.12		
		Content of large stones	0.01	Cutbanks cave	0.10		
				Content of large stones	0.01		

Table 10b.--Building Site Development--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets: Rating class and limiting features	Value	Shallow excavations: Rating class and limiting features	Value	Lawns and landscaping: Rating class and limiting features	Value
16:							
Skisams	25	Very limited:		Very limited:		Very limited:	
		Depth to hard bedrock	1.00	Depth to hard bedrock	1.00	Depth to bedrock	1.00
		Frost action	0.50	Cutbanks cave	0.10	Droughty	1.00
Winnemucca	20	Somewhat limited:		Somewhat limited:		Not limited	
		Frost action	0.50	Too clayey	0.12		
				Cutbanks cave	0.10		
17:							
Cathedral	40	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Depth to hard bedrock	1.00	Slope	1.00
		Depth to hard bedrock	1.00	Slope	1.00	Content of large stones	1.00
		Frost action	0.50	Cutbanks cave	0.10	Droughty	1.00
						Depth to bedrock	1.00
Veatch	40	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to hard bedrock	0.42	Depth to hard bedrock	1.00	Droughty	0.55
				Cutbanks cave	0.10	Depth to bedrock	0.42
18:							
Cerro	80	Very limited:		Somewhat limited:		Not limited	
		Shrink-swell	1.00	Too clayey	0.28		
				Cutbanks cave	0.10		
19:							
Cerro	70	Very limited:		Somewhat limited:		Somewhat limited:	
		Shrink-swell	1.00	Too clayey	0.28	Slope	0.04
		Slope	0.04	Cutbanks cave	0.10		
				Slope	0.04		
20:							
Cerro	80	Very limited:		Very limited:		Very limited:	
		Shrink-swell	1.00	Slope	1.00	Slope	1.00
		Slope	1.00	Too clayey	0.28		
				Cutbanks cave	0.10		
21:							
Chipeta	85	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Depth to soft bedrock	1.00	Depth to bedrock	1.00
		Depth to soft bedrock	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	0.50	Cutbanks cave	0.10	Droughty	0.94
						Salinity	0.50
22:							
Clapper	85	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Content of large stones	1.00
		Content of large stones	0.62	Content of large stones	0.62	Slope	1.00
				Cutbanks cave	0.10	Droughty	0.34

Table 10b.--Building Site Development--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets: Rating class and limiting features	Value	Shallow excavations: Rating class and limiting features	Value	Lawns and landscaping: Rating class and limiting features	Value
23:							
Clapper	85	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Content of large stones	0.62	Content of large stones	0.62	Content of large stones	1.00
				Cutbanks cave	0.10	Droughty	0.34
24:							
Cochetopa	50	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	0.50	Too clayey	0.12		
		Frost action	0.50	Cutbanks cave	0.10		
Clayburn	20	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	0.50	Cutbanks cave	0.10		
		Frost action	0.50				
25:							
Cowestglen	90	Somewhat limited:		Somewhat limited:		Not limited	
		Flooding	0.40	Cutbanks cave	0.10		
26:							
Cryochrepts	35	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Content of large stones	1.00	Content of large stones	1.00	Content of large stones	1.00
				Cutbanks cave	0.10	Droughty	0.34
Cryoborolls	30	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Content of large stones	0.11	Depth to soft bedrock	1.00	Depth to bedrock	1.00
				Content of large stones	0.11	Droughty	0.99
				Cutbanks cave	0.10	Content of large stones	0.03
Rubble land	25	Not rated		Not rated		Not rated	
27:							
Cryorthents	55	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Depth to soft bedrock	0.84	Droughty	1.00
				Cutbanks cave	0.10	Gravel content	1.00
						Depth to bedrock	0.84
						Content of large stones	0.11
Rock outcrop	30	Not rated		Not rated		Not rated	
28:							
Cumulic Haploborolls	90	Very limited:		Somewhat limited:		Somewhat limited:	
		Flooding	1.00	Flooding	0.60	Flooding	0.60
				Depth to saturated zone	0.35	Content of large stones	0.20
				Cutbanks cave	0.10	Gravel content	0.09
						Droughty	0.02

Table 10b.--Building Site Development--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets: Rating class and limiting features	Value	Shallow excavations: Rating class and limiting features	Value	Lawns and landscaping: Rating class and limiting features	Value
29:							
Debeque	85	Somewhat limited:		Somewhat limited:		Very limited:	
		Slope	0.84	Slope	0.84	Droughty	1.00
		Frost action	0.50	Cutbanks cave	0.10	Gravel content	1.00
						Slope	0.84
						Content of large stones	0.01
30:							
Debeque	40	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Droughty	1.00
		Frost action	0.50	Cutbanks cave	0.10	Gravel content	1.00
						Slope	1.00
						Content of large stones	0.01
Hesperus	35	Somewhat limited:		Somewhat limited:		Somewhat limited:	
		Shrink-swell	0.50	Slope	0.16	Slope	0.16
		Frost action	0.50	Cutbanks cave	0.10		
		Slope	0.16				
31:							
Dominguez	85	Very limited:		Somewhat limited:		Not limited	
		Shrink-swell	1.00	Too clayey	0.12		
				Cutbanks cave	0.10		
32:							
Dominguez	80	Very limited:		Somewhat limited:		Not limited	
		Shrink-swell	1.00	Too clayey	0.12		
				Cutbanks cave	0.10		
33:							
Emmons	30	Somewhat limited:		Somewhat limited:		Somewhat limited:	
		Slope	0.84	Slope	0.84	Slope	0.84
		Frost action	0.50	Cutbanks cave	0.10	Content of large stones	0.01
Cerro	25	Very limited:		Very limited:		Very limited:	
		Shrink-swell	1.00	Slope	1.00	Slope	1.00
		Slope	1.00	Too clayey	0.28		
				Cutbanks cave	0.10		
Pagoda	25	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	0.50	Cutbanks cave	0.10		
				Too clayey	0.03		
34:							
Empedrado	80	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	0.10		
35:							
Empedrado	35	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	0.10		

Table 10b.--Building Site Development--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
35:							
Pagoda	30	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	0.50	Cutbanks cave	0.10		
				Too clayey	0.03		
Godding	25	Very limited:		Very limited:		Very limited:	
		Content of large stones	1.00	Content of large stones	1.00	Slope	1.00
		Slope	1.00	Slope	1.00	Content of large stones	0.68
		Shrink-swell	0.50	Too clayey	0.12	Droughty	0.04
				Cutbanks cave	0.10		
36:							
Fluvaquents	80	Very limited:		Very limited:		Somewhat limited:	
		Frost action	1.00	Depth to saturated zone	1.00	Flooding	0.60
		Flooding	1.00	Flooding	0.60	Depth to saturated zone	0.03
		Depth to saturated zone	0.03	Cutbanks cave	0.10	Content of large stones	0.01
37:							
Fughes	90	Very limited:		Somewhat limited:		Not limited	
		Shrink-swell	1.00	Cutbanks cave	0.10		
		Frost action	0.50				
38:							
Fughes	90	Very limited:		Somewhat limited:		Not limited	
		Shrink-swell	1.00	Cutbanks cave	0.10		
		Frost action	0.50				
39:							
Fughes	60	Very limited:		Somewhat limited:		Not limited	
		Shrink-swell	1.00	Cutbanks cave	0.10		
		Frost action	0.50				
Hesperus	25	Somewhat limited:		Somewhat limited:		Not limited	
		Shrink-swell	0.50	Cutbanks cave	0.10		
		Frost action	0.50				
40:							
Godding	75	Very limited:		Very limited:		Very limited:	
		Content of large stones	1.00	Content of large stones	1.00	Slope	1.00
		Slope	1.00	Slope	1.00	Content of large stones	0.68
		Shrink-swell	0.50	Too clayey	0.12	Droughty	0.03
				Cutbanks cave	0.10		
41:							
Golime	80	Very limited:		Very limited:		Very limited:	
		Content of large stones	1.00	Content of large stones	1.00	Content of large stones	1.00
		Slope	0.16	Slope	0.16	Slope	0.16
				Cutbanks cave	0.10	Droughty	0.01
42:							
Grobutte	90	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
				Cutbanks cave	0.10	Gravel content	1.00
						Droughty	0.34

Table 10b.--Building Site Development--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets: Rating class and limiting features	Value	Shallow excavations: Rating class and limiting features	Value	Lawns and landscaping: Rating class and limiting features	Value
43:							
Haploborolls	60	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Depth to hard bedrock	1.00	Droughty	0.28
		Content of large stones	0.44	Content of large stones	0.44	Depth to bedrock	0.10
		Depth to hard bedrock	0.10	Cutbanks cave	0.10		
Rock outcrop	30	Not rated		Not rated		Not rated	
44:							
Happle	80	Somewhat limited:		Somewhat limited:		Very limited:	
		Frost action	0.50	Cutbanks cave	0.10	Gravel content	1.00
						Droughty	0.82
						Content of large stones	0.03
45:							
Happle	80	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Gravel content	1.00
		Frost action	0.50	Cutbanks cave	0.10	Slope	1.00
						Droughty	0.82
						Content of large stones	0.03
46:							
Happle	50	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	0.10	Gravel content	1.00
						Droughty	0.82
						Content of large stones	0.03
Rock outcrop	35	Not rated		Not rated		Not rated	
47:							
Hesperus	35	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	0.50	Cutbanks cave	0.10		
		Frost action	0.50				
Empedrado	30	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	0.10		
Pagoda	20	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	0.50	Cutbanks cave	0.10		
				Too clayey	0.03		
48:							
Hesperus	35	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	0.50	Cutbanks cave	0.10		
		Frost action	0.50				
Empedrado	30	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	0.10		

Table 10b.--Building Site Development--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets: Rating class and limiting features	Value	Shallow excavations: Rating class and limiting features	Value	Lawns and landscaping: Rating class and limiting features	Value
48:							
Pagoda	20	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	0.50	Cutbanks cave	0.10		
				Too clayey	0.03		
49:							
Hesperus	45	Somewhat limited:		Somewhat limited:		Not limited	
		Shrink-swell	0.50	Cutbanks cave	0.10		
		Frost action	0.50				
Pagoda	40	Somewhat limited:		Somewhat limited:		Not limited	
		Shrink-swell	0.50	Cutbanks cave	0.10		
				Too clayey	0.03		
50:							
Irigul	40	Very limited:		Very limited:		Very limited:	
		Depth to hard bedrock	1.00	Depth to hard bedrock	1.00	Droughty	1.00
						Depth to bedrock	1.00
		Slope	1.00	Slope	1.00	Slope	1.00
				Cutbanks cave	0.10	Gravel content	0.05
Starman	30	Very limited:		Very limited:		Very limited:	
		Depth to hard bedrock	1.00	Depth to hard bedrock	1.00	Droughty	1.00
						Depth to bedrock	1.00
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	0.10	Content of large stones	0.54
						Gravel content	0.04
51:							
Mesa	50	Somewhat limited:		Somewhat limited:		Not limited	
		Shrink-swell	0.50	Cutbanks cave	0.10		
Avalon	35	Somewhat limited:		Somewhat limited:		Somewhat limited:	
		Frost action	0.50	Cutbanks cave	0.10	Salinity	0.01
52:							
Northwater	50	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	0.10		
Adel	40	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	0.10		
53:							
Pagoda	50	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	0.50	Cutbanks cave	0.10		
				Too clayey	0.03		
Hesperus	20	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	0.50	Cutbanks cave	0.10		
		Frost action	0.50				

Table 10b.--Building Site Development--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets: Rating class and limiting features	Value	Shallow excavations: Rating class and limiting features	Value	Lawns and landscaping: Rating class and limiting features	Value
54:							
Panitchen	85	Not limited		Somewhat limited: Cutbanks cave	 0.10	Not limited	
55:							
Parachute	60	Very limited: Slope Frost action	 1.00 0.50	Very limited: Slope Depth to soft bedrock Cutbanks cave	 1.00 0.42 0.10	Very limited: Slope Droughty Depth to bedrock	 1.00 0.65 0.42
Irigul	30	Very limited: Depth to hard bedrock Slope	 1.00 1.00	Very limited: Depth to hard bedrock Slope Cutbanks cave	 1.00 1.00 0.10	Very limited: Droughty Depth to bedrock Slope Gravel content	 1.00 1.00 1.00 0.05
56:							
Parachute	35	Very limited: Slope Frost action	 1.00 0.50	Very limited: Slope Depth to soft bedrock Cutbanks cave	 1.00 0.42 0.10	Very limited: Slope Droughty Depth to bedrock	 1.00 0.65 0.42
Irigul	30	Very limited: Slope Depth to hard bedrock	 1.00 1.00	Very limited: Depth to hard bedrock Slope Cutbanks cave	 1.00 1.00 0.10	Very limited: Slope Droughty Depth to bedrock Gravel content	 1.00 1.00 1.00 0.05
Rhone	20	Very limited: Slope Frost action	 1.00 0.50	Very limited: Slope Cutbanks cave	 1.00 0.10	Very limited: Slope	 1.00
57:							
Parachute	55	Very limited: Slope Frost action	 1.00 0.50	Very limited: Slope Depth to soft bedrock Cutbanks cave	 1.00 0.42 0.10	Very limited: Slope Droughty Depth to bedrock	 1.00 0.65 0.42
Rhone	35	Very limited: Slope Frost action	 1.00 0.50	Very limited: Slope Cutbanks cave	 1.00 0.10	Very limited: Slope	 1.00
58:							
Peninsula	80	Somewhat limited: Shrink-swell	 0.50	Somewhat limited: Cutbanks cave	 0.10	Somewhat limited: Content of large stones	 0.01
59:							
Persayo	85	Somewhat limited: Depth to soft bedrock Slope Shrink-swell	 1.00 0.96 0.50	Very limited: Depth to soft bedrock Slope Cutbanks cave	 1.00 0.96 0.10	Very limited: Depth to bedrock Droughty Slope Salinity	 1.00 0.99 0.96 0.01

Table 10b.--Building Site Development--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
60:							
Redcreek	60	Very limited:		Very limited:		Very limited:	
		Depth to hard bedrock	1.00	Depth to hard bedrock	1.00	Droughty	1.00
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
				Cutbanks cave	0.10	Slope	1.00
Rentsac	30	Very limited:		Very limited:		Very limited:	
		Depth to hard bedrock	1.00	Depth to hard bedrock	1.00	Droughty	1.00
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Frost action	0.50	Cutbanks cave	0.10	Slope	1.00
						Gravel content	0.08
						Content of large stones	0.03
61:							
Rock outcrop	65	Not rated		Not rated		Not rated	
Torriorthents	30	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Depth to hard bedrock	1.00	Slope	1.00
		Depth to hard bedrock	1.00	Slope	1.00	Droughty	1.00
				Cutbanks cave	0.10	Depth to bedrock	1.00
						Content of large stones	0.20
						Gravel content	0.09
62:							
Shawa	85	Somewhat limited:		Somewhat limited:		Somewhat limited:	
		Slope	0.63	Slope	0.63	Slope	0.63
		Frost action	0.50	Cutbanks cave	0.10		
63:							
Silas	85	Somewhat limited:		Somewhat limited:		Not limited	
		Frost action	0.50	Depth to saturated zone	0.24		
		Flooding	0.40	Cutbanks cave	0.10		
64:							
Torrifluvents	40	Very limited:		Somewhat limited:		Somewhat limited:	
		Flooding	1.00	Flooding	0.60	Flooding	0.60
				Cutbanks cave	0.10		
Gullied land	40	Not rated		Not rated		Not rated	
65:							
Torriorthents	50	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to hard bedrock	1.00	Depth to hard bedrock	1.00	Droughty	1.00
				Cutbanks cave	0.10	Depth to bedrock	1.00
						Content of large stones	0.20
						Gravel content	0.09
Rock outcrop	40	Not rated		Not rated		Not rated	

Table 10b.--Building Site Development--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets: Rating class and limiting features	Value	Shallow excavations: Rating class and limiting features	Value	Lawns and landscaping: Rating class and limiting features	Value
66:							
Torriorthents	50	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to hard bedrock	1.00	Depth to hard bedrock	1.00	Droughty	1.00
				Cutbanks cave	0.10	Depth to bedrock	1.00
						Content of large stones	0.20
						Gravel content	0.09
Rock outcrop	40	Not rated		Not rated		Not rated	
67:							
Tosca	80	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	0.10	Gravel content	0.68
						Droughty	0.13
68:							
Trail	90	Somewhat limited:		Somewhat limited:		Somewhat limited:	
		Flooding	0.40	Cutbanks cave	0.10	Droughty	0.02
69:							
Travessilla	45	Very limited:		Very limited:		Very limited:	
		Depth to hard bedrock	1.00	Depth to hard bedrock	1.00	Droughty	1.00
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
				Cutbanks cave	0.10	Slope	1.00
Rock outcrop	40	Not rated		Not rated		Not rated	
70:							
Uffens	85	Not limited		Somewhat limited:		Very limited:	
				Cutbanks cave	0.10	Sodium content	1.00
71:							
Utso	60	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	0.10	Gravel content	0.32
						Droughty	0.22
Rock outcrop	25	Not rated		Not rated		Not rated	
72:							
Wesdy	70	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Content of large stones	1.00
		Content of large stones	0.82	Content of large stones	0.82	Slope	1.00
		Shrink-swell	0.50	Cutbanks cave	0.10		
				Too clayey	0.13		
73:							
Wesdy	45	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Content of large stones	0.82	Content of large stones	0.82	Content of large stones	1.00
		Shrink-swell	0.50	Cutbanks cave	0.10		
				Too clayey	0.03		

Table 10b.--Building Site Development--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
73:							
Northwater	40	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	0.10		
74:							
Winnemucca	60	Somewhat limited:		Somewhat limited:		Not limited	
		Frost action	0.50	Too clayey	0.12		
				Cutbanks cave	0.10		
Castino	30	Somewhat limited:		Very limited:		Somewhat limited:	
		Frost action	0.50	Depth to hard bedrock	1.00	Depth to bedrock	0.42
		Depth to hard bedrock	0.42	Too clayey	0.12		
		Content of large stones	0.01	Cutbanks cave	0.10		
				Content of large stones	0.01		
75:							
Wrayha	35	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	0.50	Cutbanks cave	0.10	Gravel content	0.20
				Too clayey	0.03	Content of large stones	0.01
Rabbitex	20	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	0.10		
Veatch	20	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to hard bedrock	0.42	Depth to hard bedrock	1.00	Droughty	0.55
				Cutbanks cave	0.10	Depth to bedrock	0.42
76:							
Wrayha	45	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Shrink-swell	0.50	Cutbanks cave	0.10	Gravel content	0.20
				Too clayey	0.03	Content of large stones	0.01
Veatch	25	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Depth to hard bedrock	1.00	Slope	1.00
		Depth to hard bedrock	0.42	Slope	1.00	Droughty	0.55
				Cutbanks cave	0.10	Depth to bedrock	0.42
Rabbitex	20	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	0.10		
77:							
Yamo	55	Somewhat limited:		Somewhat limited:		Somewhat limited:	
		Slope	0.96	Slope	0.96	Slope	0.96
				Cutbanks cave	0.10		

Table 10b.--Building Site Development--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets: Rating class and limiting features	Value	Shallow excavations: Rating class and limiting features	Value	Lawns and landscaping: Rating class and limiting features	Value
77:							
Redcreek------------	35	Very limited:		Very limited:		Very limited:	
		Depth to hard		Depth to hard		Droughty	1.00
		bedrock	1.00	bedrock	1.00	Depth to bedrock	1.00
		Slope	0.96	Slope	0.96	Slope	0.96
				Cutbanks cave	0.10		
78:							
Youngston-----------	90	Not limited		Somewhat limited:		Not limited	
				Cutbanks cave	0.10		
79:							
Water---------------	100	Not rated		Not rated		Not rated	

Table 11a.--Sanitary Facilities

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the potential limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields: Rating class and limiting features	Value	Sewage lagoons: Rating class and limiting features	Value
1:					
Aga	85	Very limited:		Very limited:	
		Flooding	1.00	Flooding	1.00
		Filtering capacity	1.00	Seepage	1.00
		Depth to saturated zone	0.84	Depth to saturated zone	0.17
		Restricted permeability	0.50		
2:					
Badland	80	Not rated		Not rated	
3:					
Barx	85	Somewhat limited:		Very limited:	
		Restricted permeability	0.46	Slope	1.00
				Seepage	1.00
4:					
Barx	60	Somewhat limited:		Very limited:	
		Restricted permeability	0.46	Slope	1.00
				Seepage	1.00
Clapper	25	Somewhat limited:		Very limited:	
		Content of large stones	0.62	Content of large stones	1.00
		Restricted permeability	0.46	Slope	1.00
				Seepage	0.53
5:					
Battlement	90	Somewhat limited:		Very limited:	
		Restricted permeability	0.50	Seepage	1.00
		Flooding	0.40	Slope	0.66
				Flooding	0.40
6:					
Battlement	90	Somewhat limited:		Somewhat limited:	
		Restricted permeability	0.72	Slope	0.66
		Flooding	0.40	Seepage	0.50
				Flooding	0.40
7:					
Biedsaw	45	Very limited:		Very limited:	
		Restricted permeability	1.00	Slope	1.00
		Slope	1.00		
Sunup	25	Very limited:		Very limited:	
		Depth to bedrock	1.00	Depth to hard bedrock	1.00
		Slope	1.00	Slope	1.00

Table 11a.--Sanitary Facilities--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields: Rating class and limiting features	Value	Sewage lagoons: Rating class and limiting features	Value
8:					
Billings	90	Very limited:		Somewhat limited:	
		Restricted permeability	1.00	Slope	0.31
9:					
Bookcliff	45	Somewhat limited:		Very limited:	
		Slope	0.96	Slope	1.00
		Restricted permeability	0.46	Seepage	0.53
Utso	40	Very limited:		Very limited:	
		Restricted permeability	1.00	Slope	1.00
		Slope	0.96	Seepage	0.53
		Depth to bedrock	0.78	Depth to soft bedrock	0.42
10:					
Borollic Calciorthids	80	Very limited:		Very limited:	
		Slope	1.00	Slope	1.00
		Restricted permeability	0.72	Seepage	0.28
		Depth to bedrock	0.01		
11:					
Borpark	70	Very limited:		Very limited:	
		Slope	1.00	Slope	1.00
		Restricted permeability	1.00	Content of large stones	1.00
		Content of large stones	0.90	Seepage	0.53
12:					
Bunkwater	85	Very limited:		Somewhat limited:	
		Restricted permeability	1.00	Slope	0.66
13:					
Caballo	85	Very limited:		Very limited:	
		Restricted permeability	1.00	Slope	1.00
		Slope	1.00	Seepage	0.53
		Depth to bedrock	0.78	Depth to soft bedrock	0.42
		Content of large stones	0.43	Content of large stones	0.04
14:					
Callings	90	Very limited:		Very limited:	
		Restricted permeability	1.00	Seepage	1.00
		Content of large stones	0.20	Slope	0.91
15:					
Cameo	90	Somewhat limited:		Very limited:	
		Flooding	0.40	Seepage	1.00
				Flooding	0.40
				Slope	0.31

Table 11a.--Sanitary Facilities--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields: Rating class and limiting features	Value	Sewage lagoons: Rating class and limiting features	Value
16:					
Castino	40	Very limited:		Very limited:	
		Restricted permeability	1.00	Depth to hard bedrock	1.00
		Depth to bedrock	1.00	Slope	0.91
		Content of large stones	0.01	Seepage	0.53
Skisams	25	Very limited:		Very limited:	
		Depth to bedrock	1.00	Depth to hard bedrock	1.00
				Seepage	1.00
				Slope	0.91
Winnemucca	20	Very limited:		Somewhat limited:	
		Restricted permeability	1.00	Slope	0.91
				Seepage	0.53
17:					
Cathedral	40	Very limited:		Very limited:	
		Depth to bedrock	1.00	Depth to hard bedrock	1.00
		Slope	1.00	Slope	1.00
				Content of large stones	0.09
Veatch	40	Very limited:		Very limited:	
		Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to hard bedrock	1.00
				Seepage	1.00
18:					
Cerro	80	Very limited:		Somewhat limited:	
		Restricted permeability	1.00	Slope	0.31
19:					
Cerro	70	Very limited:		Very limited:	
		Restricted permeability	1.00	Slope	1.00
		Slope	0.04		
20:					
Cerro	80	Very limited:		Very limited:	
		Restricted permeability	1.00	Slope	1.00
		Slope	1.00		
21:					
Chipeta	85	Very limited:		Very limited:	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Slope	1.00	Slope	1.00

Table 11a.--Sanitary Facilities--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields: Rating class and limiting features	Value	Sewage lagoons: Rating class and limiting features	Value
22:					
Clapper	85	Very limited:		Very limited:	
		Slope	1.00	Slope	1.00
		Content of large stones	0.62	Content of large stones	1.00
		Restricted permeability	0.46	Seepage	0.53
23:					
Clapper	85	Very limited:		Very limited:	
		Slope	1.00	Slope	1.00
		Content of large stones	0.62	Content of large stones	1.00
		Restricted permeability	0.46	Seepage	0.53
24:					
Cochetopa	50	Very limited:		Very limited:	
		Restricted permeability	1.00	Slope	1.00
		Slope	1.00		
Clayburn	20	Very limited:		Very limited:	
		Restricted permeability	1.00	Slope	1.00
		Slope	1.00	Seepage	1.00
25:					
Cowestglen	90	Somewhat limited:		Very limited:	
		Flooding	0.40	Seepage	1.00
				Slope	0.66
				Flooding	0.40
26:					
Cryochrepts	35	Very limited:		Very limited:	
		Slope	1.00	Slope	1.00
		Content of large stones	1.00	Content of large stones	1.00
		Restricted permeability	0.72	Seepage	1.00
		Depth to bedrock	0.01		
Cryoborolls	30	Very limited:		Very limited:	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Slope	1.00	Slope	1.00
		Content of large stones	0.11	Content of large stones	0.02
Rubble land	25	Not rated		Not rated	
27:					
Cryorthents	55	Very limited:		Very limited:	
		Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Restricted permeability	0.50	Seepage	0.50
Rock outcrop	30	Not rated		Not rated	

Table 11a.--Sanitary Facilities--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
28:					
Cumulic Haploborolls	90	Very limited:		Very limited:	
		Flooding	1.00	Flooding	1.00
		Filtering capacity	1.00	Seepage	1.00
		Depth to saturated zone	0.84	Depth to saturated zone	0.17
		Restricted permeability	0.71		
29:					
Debeque	85	Somewhat limited:		Very limited:	
		Slope	0.84	Seepage	1.00
				Slope	1.00
30:					
Debeque	40	Very limited:		Very limited:	
		Slope	1.00	Seepage	1.00
				Slope	1.00
Hesperus	35	Very limited:		Very limited:	
		Restricted permeability	1.00	Slope	1.00
		Slope	0.16		
31:					
Dominguez	85	Very limited:		Not limited	
		Restricted permeability	1.00		
32:					
Dominguez	80	Very limited:		Somewhat limited:	
		Restricted permeability	1.00	Slope	0.91
33:					
Emmons	30	Somewhat limited:		Very limited:	
		Slope	0.84	Slope	1.00
		Restricted permeability	0.46	Seepage	0.53
Cerro	25	Very limited:		Very limited:	
		Restricted permeability	1.00	Slope	1.00
		Slope	1.00		
Pagoda	25	Very limited:		Very limited:	
		Restricted permeability	1.00	Slope	1.00
		Slope	1.00		
34:					
Empedrado	80	Very limited:		Very limited:	
		Slope	1.00	Slope	1.00
		Restricted permeability	0.50	Seepage	0.53

Table 11a.--Sanitary Facilities--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields: Rating class and limiting features	Value	Sewage lagoons: Rating class and limiting features	Value
35:					
Empedrado	35	Very limited:		Very limited:	
		Slope	1.00	Slope	1.00
		Restricted permeability	0.50	Seepage	0.53
Pagoda	30	Very limited:		Very limited:	
		Restricted permeability	1.00	Slope	1.00
		Slope	1.00		
Godding	25	Very limited:		Very limited:	
		Restricted permeability	1.00	Content of large stones	1.00
		Content of large stones	1.00	Slope	1.00
		Slope	1.00		
36:					
Fluvaquents	80	Very limited:		Very limited:	
		Flooding	1.00	Flooding	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Restricted permeability	0.72	Seepage	1.00
37:					
Fughes	90	Very limited:		Somewhat limited:	
		Restricted permeability	1.00	Slope	0.31
38:					
Fughes	90	Very limited:		Somewhat limited:	
		Restricted permeability	1.00	Slope	0.91
39:					
Fughes	60	Very limited:		Very limited:	
		Restricted permeability	1.00	Slope	1.00
Hesperus	25	Very limited:		Very limited:	
		Restricted permeability	1.00	Slope	1.00
40:					
Godding	75	Very limited:		Very limited:	
		Restricted permeability	1.00	Slope	1.00
		Content of large stones	1.00	Content of large stones	1.00
		Slope	1.00		
41:					
Golime	80	Very limited:		Very limited:	
		Restricted permeability	1.00	Slope	1.00
		Content of large stones	1.00	Seepage	1.00
		Slope	0.16	Content of large stones	1.00

Table 11a.--Sanitary Facilities--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields: Rating class and limiting features	Value	Sewage lagoons: Rating class and limiting features	Value
42:					
Grobutte	90	Very limited:		Very limited:	
		Slope	1.00	Slope	1.00
		Restricted permeability	0.46	Seepage	0.53
43:					
Haploborolls	60	Very limited:		Very limited:	
		Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to hard bedrock	1.00
		Restricted permeability	0.46	Content of large stones	0.72
		Content of large stones	0.44	Seepage	0.53
Rock outcrop	30	Not rated		Not rated	
44:					
Happle	80	Somewhat limited:		Very limited:	
		Restricted permeability	0.50	Slope	1.00
				Seepage	1.00
45:					
Happle	80	Very limited:		Very limited:	
		Slope	1.00	Slope	1.00
		Restricted permeability	0.50	Seepage	1.00
46:					
Happle	50	Very limited:		Very limited:	
		Slope	1.00	Slope	1.00
		Restricted permeability	0.50	Seepage	1.00
Rock outcrop	35	Not rated		Not rated	
47:					
Hesperus	35	Very limited:		Very limited:	
		Restricted permeability	1.00	Slope	1.00
		Slope	1.00		
Empedrado	30	Very limited:		Very limited:	
		Slope	1.00	Slope	1.00
		Restricted permeability	0.50	Seepage	0.53
Pagoda	20	Very limited:		Very limited:	
		Restricted permeability	1.00	Slope	1.00
		Slope	1.00		
48:					
Hesperus	35	Very limited:		Very limited:	
		Slope	1.00	Slope	1.00
		Restricted permeability	1.00		

Table 11a.--Sanitary Facilities--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields: Rating class and limiting features	Value	Sewage lagoons: Rating class and limiting features	Value
48:					
Empedrado	30	Very limited:		Very limited:	
		Slope	1.00	Slope	1.00
		Restricted permeability	0.50	Seepage	0.53
Pagoda	20	Very limited:		Very limited:	
		Restricted permeability	1.00	Slope	1.00
		Slope	1.00		
49:					
Hesperus	45	Very limited:		Very limited:	
		Restricted permeability	1.00	Slope	1.00
Pagoda	40	Very limited:		Very limited:	
		Restricted permeability	1.00	Slope	1.00
50:					
Irigul	40	Very limited:		Very limited:	
		Depth to bedrock	1.00	Depth to hard bedrock	1.00
		Slope	1.00	Slope	1.00
				Seepage	0.53
Starman	30	Very limited:		Very limited:	
		Depth to bedrock	1.00	Depth to hard bedrock	1.00
		Slope	1.00	Slope	1.00
51:					
Mesa	50	Very limited:		Very limited:	
		Restricted permeability	1.00	Slope	1.00
				Seepage	0.53
Avalon	35	Somewhat limited:		Very limited:	
		Restricted permeability	0.46	Slope	1.00
				Seepage	1.00
52:					
Northwater	50	Very limited:		Very limited:	
		Slope	1.00	Slope	1.00
		Restricted permeability	0.46	Seepage	1.00
Adel	40	Very limited:		Very limited:	
		Slope	1.00	Slope	1.00
		Restricted permeability	0.50	Seepage	0.50
53:					
Pagoda	50	Very limited:		Very limited:	
		Restricted permeability	1.00	Slope	1.00
		Slope	1.00		

Table 11a.--Sanitary Facilities--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields: Rating class and limiting features	Value	Sewage lagoons: Rating class and limiting features	Value
53:					
Hesperus	20	Very limited:		Very limited:	
		Restricted permeability	1.00	Slope	1.00
		Slope	1.00		
54:					
Panitchen	85	Very limited:		Very limited:	
		Restricted permeability	1.00	Seepage	1.00
				Slope	0.31
55:					
Parachute	60	Very limited:		Very limited:	
		Restricted permeability	1.00	Depth to soft bedrock	1.00
		Depth to bedrock	1.00	Slope	1.00
		Slope	1.00	Seepage	0.53
Irigul	30	Very limited:		Very limited:	
		Depth to bedrock	1.00	Depth to hard bedrock	1.00
		Slope	1.00	Slope	1.00
				Seepage	0.53
56:					
Parachute	35	Very limited:		Very limited:	
		Restricted permeability	1.00	Slope	1.00
		Slope	1.00	Depth to soft bedrock	1.00
		Depth to bedrock	1.00	Seepage	0.53
Irigul	30	Very limited:		Very limited:	
		Depth to bedrock	1.00	Depth to hard bedrock	1.00
		Slope	1.00	Slope	1.00
				Seepage	0.53
Rhone	20	Very limited:		Very limited:	
		Slope	1.00	Slope	1.00
		Depth to bedrock	0.78	Seepage	0.53
		Restricted permeability	0.46	Depth to soft bedrock	0.42
57:					
Parachute	55	Very limited:		Very limited:	
		Restricted permeability	1.00	Depth to soft bedrock	1.00
		Depth to bedrock	1.00	Slope	1.00
		Slope	1.00	Seepage	0.53
Rhone	35	Very limited:		Very limited:	
		Slope	1.00	Slope	1.00
		Depth to bedrock	0.78	Seepage	0.53
		Restricted permeability	0.46	Depth to soft bedrock	0.42
58:					
Peninsula	80	Very limited:		Somewhat limited:	
		Restricted permeability	1.00	Slope	0.91
				Seepage	0.53

Table 11a.--Sanitary Facilities--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields: Rating class and limiting features	Value	Sewage lagoons: Rating class and limiting features	Value
59:					
Persayo	85	Very limited:		Very limited:	
		Depth to bedrock	1.00	Depth to soft bedrock	1.00
		Slope	0.96	Slope	1.00
60:					
Redcreek	60	Very limited:		Very limited:	
		Depth to bedrock	1.00	Depth to hard bedrock	1.00
		Slope	1.00	Seepage	1.00
				Slope	1.00
Rentsac	30	Very limited:		Very limited:	
		Depth to bedrock	1.00	Depth to hard bedrock	1.00
		Slope	1.00	Seepage	1.00
				Slope	1.00
61:					
Rock outcrop	65	Not rated		Not rated	
Torriorthents	30	Very limited:		Very limited:	
		Depth to bedrock	1.00	Depth to hard bedrock	1.00
		Slope	1.00	Slope	1.00
				Seepage	1.00
62:					
Shawa	85	Somewhat limited:		Very limited:	
		Slope	0.63	Slope	1.00
		Restricted permeability	0.46	Seepage	0.53
63:					
Silas	85	Very limited:		Very limited:	
		Restricted permeability	1.00	Slope	1.00
		Depth to saturated zone	0.65	Seepage	0.53
		Flooding	0.40	Flooding	0.40
				Depth to saturated zone	0.02
64:					
Torrifluvents	40	Very limited:		Very limited:	
		Flooding	1.00	Flooding	1.00
				Seepage	1.00
Gullied land	40	Not rated		Not rated	
65:					
Torriorthents	50	Very limited:		Very limited:	
		Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Seepage	1.00
				Depth to hard bedrock	1.00
Rock outcrop	40	Not rated		Not rated	

Table 11a.--Sanitary Facilities--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields: Rating class and limiting features	Value	Sewage lagoons: Rating class and limiting features	Value
66:					
Torriorthents	50	Very limited:		Very limited:	
		Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Seepage	1.00
				Depth to hard bedrock	1.00
Rock outcrop	40	Not rated		Not rated	
67:					
Tosca	80	Very limited:		Very limited:	
		Slope	1.00	Slope	1.00
		Restricted permeability	0.50	Seepage	1.00
68:					
Trail	90	Very limited:		Very limited:	
		Filtering capacity	1.00	Seepage	1.00
		Flooding	0.40	Flooding	0.40
				Slope	0.08
69:					
Travessilla	45	Very limited:		Very limited:	
		Depth to bedrock	1.00	Depth to hard bedrock	1.00
		Slope	1.00	Slope	1.00
Rock outcrop	40	Not rated		Not rated	
70:					
Uffens	85	Very limited:		Somewhat limited:	
		Restricted permeability	1.00	Slope	0.66
				Seepage	0.53
71:					
Utso	60	Very limited:		Very limited:	
		Slope	1.00	Slope	1.00
		Restricted permeability	0.46	Seepage	0.53
Rock outcrop	25	Not rated		Not rated	
72:					
Wesdy	70	Very limited:		Very limited:	
		Restricted permeability	1.00	Slope	1.00
		Slope	1.00	Seepage	1.00
		Content of large stones	0.82	Content of large stones	1.00
73:					
Wesdy	45	Very limited:		Very limited:	
		Restricted permeability	1.00	Slope	1.00
		Slope	1.00	Seepage	1.00
		Content of large stones	0.82	Content of large stones	1.00

Table 11a.--Sanitary Facilities--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields: Rating class and limiting features	Value	Sewage lagoons: Rating class and limiting features	Value
73:					
Northwater	40	Very limited:		Very limited:	
		Slope	1.00	Slope	1.00
		Restricted permeability	0.46	Seepage	1.00
74:					
Winnemucca	60	Very limited:		Somewhat limited:	
		Restricted permeability	1.00	Slope	0.91
				Seepage	0.53
Castino	30	Very limited:		Very limited:	
		Restricted permeability	1.00	Depth to hard bedrock	1.00
		Depth to bedrock	1.00	Slope	0.91
		Content of large stones	0.01	Seepage	0.53
75:					
Wrayha	35	Very limited:		Very limited:	
		Restricted permeability	1.00	Slope	1.00
		Slope	1.00		
Rabbitex	20	Very limited:		Very limited:	
		Slope	1.00	Slope	1.00
		Restricted permeability	0.46	Seepage	0.53
Veatch	20	Very limited:		Very limited:	
		Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to hard bedrock	1.00
				Seepage	0.50
76:					
Wrayha	45	Very limited:		Very limited:	
		Restricted permeability	1.00	Slope	1.00
		Slope	1.00		
Veatch	25	Very limited:		Very limited:	
		Depth to bedrock	1.00	Slope	1.00
		Slope	1.00	Depth to hard bedrock	1.00
				Seepage	0.50
Rabbitex	20	Very limited:		Very limited:	
		Slope	1.00	Slope	1.00
		Restricted permeability	0.46	Seepage	0.53
77:					
Yamo	55	Somewhat limited:		Very limited:	
		Slope	0.96	Slope	1.00
		Restricted permeability	0.50	Seepage	1.00

Table 11a.--Sanitary Facilities--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields: Rating class and limiting features	Septic tank absorption fields: Value	Sewage lagoons: Rating class and limiting features	Sewage lagoons: Value
77:					
Redcreek------------	35	Very limited:		Very limited:	
		Depth to bedrock	1.00	Depth to hard bedrock	1.00
		Slope	0.96	Seepage	1.00
				Slope	1.00
78:					
Youngston-----------	90	Very limited:		Somewhat limited:	
		Restricted permeability	1.00	Slope	0.31
79:					
Water---------------	100	Not rated		Not rated	

Table 11b.--Sanitary Facilities

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the potential limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
1:							
Aga	85	Very limited:		Very limited:		Very limited:	
		Flooding	1.00	Flooding	1.00	Too sandy	1.00
		Too sandy	1.00	Depth to saturated zone	0.17	Seepage	1.00
		Depth to saturated zone	1.00			Gravel content	0.51
2:							
Badland	80	Not rated		Not rated		Not rated	
3:							
Barx	85	Not limited		Not limited		Not limited	
4:							
Barx	60	Not limited		Not limited		Not limited	
Clapper	25	Somewhat limited:		Not limited		Somewhat limited:	
		Cobble content	0.94			Content of large stones	0.55
5:							
Battlement	90	Somewhat limited:		Somewhat limited:		Not limited	
		Flooding	0.40	Flooding	0.40		
6:							
Battlement	90	Somewhat limited:		Somewhat limited:		Not limited	
		Flooding	0.40	Flooding	0.40		
7:							
Biedsaw	45	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
Sunup	25	Very limited:		Very limited:		Very limited:	
		Depth to bedrock	1.00	Slope	1.00	Depth to bedrock	1.00
		Slope	1.00			Slope	1.00
						Gravel content	0.05
8:							
Billings	90	Not limited		Not limited		Not limited	
9:							
Bookcliff	45	Somewhat limited:		Somewhat limited:		Somewhat limited:	
		Slope	0.96	Slope	0.96	Slope	0.96
		Cobble content	0.01				
Utso	40	Very limited:		Somewhat limited:		Very limited:	
		Depth to bedrock	1.00	Slope	0.96	Gravel content	1.00
		Slope	0.96	Depth to bedrock	0.42	Slope	0.96
						Depth to bedrock	0.42

Table 11b.--Sanitary Facilities--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill: Rating class and limiting features	Value	Area sanitary landfill: Rating class and limiting features	Value	Daily cover for landfill: Rating class and limiting features	Value
10:							
Borollic Calciorthids	80	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00				
11:							
Borpark	70	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Seepage	1.00			Content of large stones	1.00
		Cobble content	1.00			Too clayey	0.50
		Clayey	0.50				
12:							
Bunkwater	85	Not limited		Not limited		Not limited	
13:							
Caballo	85	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	0.42	Depth to bedrock	0.42
		Cobble content	0.41			Gravel content	0.37
						Content of large stones	0.32
14:							
Callings	90	Very limited:		Not limited		Very limited:	
		Clayey	1.00			Too clayey	1.00
		Cobble content	1.00			Content of large stones	0.65
15:							
Cameo	90	Somewhat limited:		Somewhat limited:		Somewhat limited:	
		Too sandy	0.50	Flooding	0.40	Seepage	0.50
		Flooding	0.40			Too sandy	0.50
16:							
Castino	40	Very limited:		Very limited:		Very limited:	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Clayey	0.50			Too clayey	0.50
		Cobble content	0.26				
Skisams	25	Very limited:		Very limited:		Very limited:	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
						Seepage	0.22
Winnemucca	20	Very limited:		Not limited		Very limited:	
		Clayey	1.00			Too clayey	1.00
		Cobble content	0.32				
17:							
Cathedral	40	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	1.00
						Gravel content	0.01
Veatch	40	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
				Seepage	1.00	Seepage	0.22
						Gravel content	0.02

Table 11b.--Sanitary Facilities--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
18:							
Cerro	80	Somewhat limited:		Not limited		Somewhat limited:	
		Clayey	0.50			Too clayey	0.50
19:							
Cerro	70	Somewhat limited:		Somewhat limited:		Somewhat limited:	
		Clayey	0.50	Slope	0.04	Too clayey	0.50
		Slope	0.04			Slope	0.04
20:							
Cerro	80	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Clayey	0.50			Too clayey	0.50
21:							
Chipeta	85	Very limited:		Very limited:		Very limited:	
		Depth to bedrock	1.00	Slope	1.00	Depth to bedrock	1.00
		Slope	1.00			Slope	1.00
22:							
Clapper	85	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Cobble content	0.94			Content of large stones	0.55
23:							
Clapper	85	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Cobble content	0.94			Content of large stones	0.55
24:							
Cochetopa	50	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Clayey	0.50			Too clayey	0.50
Clayburn	20	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Seepage	1.00			Too clayey	0.50
		Clayey	0.50				
25:							
Cowestglen	90	Very limited:		Somewhat limited:		Very limited:	
		Too sandy	1.00	Flooding	0.40	Too sandy	1.00
		Flooding	0.40			Seepage	0.52
26:							
Cryochrepts	35	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00			Content of large stones	1.00
		Cobble content	0.54				
Cryoborolls	30	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	1.00
		Cobble content	0.77			Too clayey	0.50
		Clayey	0.50				
Rubble land	25	Not rated		Not rated		Not rated	

Table 11b.--Sanitary Facilities--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
27:							
Cryorthents	55	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Gravel content	1.00
						Depth to bedrock	1.00
Rock outcrop	30	Not rated		Not rated		Not rated	
28:							
Cumulic Haploborolls	90	Very limited:		Very limited:		Very limited:	
		Flooding	1.00	Flooding	1.00	Seepage	1.00
		Seepage	1.00	Seepage	1.00	Gravel content	0.69
		Depth to saturated zone	1.00	Depth to saturated zone	0.17	Too sandy	0.50
		Too sandy	0.50				
29:							
Debeque	85	Very limited:		Very limited:		Very limited:	
		Seepage	1.00	Seepage	1.00	Gravel content	1.00
		Slope	0.84	Slope	0.84	Slope	0.84
						Seepage	0.50
30:							
Debeque	40	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Gravel content	1.00
		Seepage	1.00	Seepage	1.00	Slope	1.00
						Seepage	0.50
Hesperus	35	Somewhat limited:		Somewhat limited:		Somewhat limited:	
		Clayey	0.50	Slope	0.16	Too clayey	0.50
		Slope	0.16			Slope	0.16
31:							
Dominguez	85	Not limited		Not limited		Not limited	
32:							
Dominguez	80	Not limited		Not limited		Not limited	
33:							
Emmons	30	Somewhat limited:		Somewhat limited:		Somewhat limited:	
		Slope	0.84	Slope	0.84	Slope	0.84
Cerro	25	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Clayey	0.50			Too clayey	0.50
Pagoda	25	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Clayey	0.50			Too clayey	0.50
34:							
Empedrado	80	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
35:							
Empedrado	35	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00

Table 11b.--Sanitary Facilities--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill: Rating class and limiting features	Value	Area sanitary landfill: Rating class and limiting features	Value	Daily cover for landfill: Rating class and limiting features	Value
35:							
Pagoda	30	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Clayey	0.50			Too clayey	0.50
Godding	25	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Content of large stones	1.00
		Cobble content	0.94			Slope	1.00
		Clayey	0.50			Too clayey	0.50
36:							
Fluvaquents	80	Very limited:		Very limited:		Somewhat limited:	
		Flooding	1.00	Flooding	1.00	Depth to saturated zone	0.68
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Too clayey	0.50
		Clayey	0.50			Gravel content	0.03
37:							
Fughes	90	Somewhat limited:		Not limited		Somewhat limited:	
		Clayey	0.50			Too clayey	0.50
38:							
Fughes	90	Somewhat limited:		Not limited		Somewhat limited:	
		Clayey	0.50			Too clayey	0.50
39:							
Fughes	60	Somewhat limited:		Not limited		Somewhat limited:	
		Clayey	0.50			Too clayey	0.50
Hesperus	25	Somewhat limited:		Not limited		Somewhat limited:	
		Clayey	0.50			Too clayey	0.50
40:							
Godding	75	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Content of large stones	1.00
		Cobble content	0.92			Slope	1.00
		Clayey	0.50			Too clayey	0.50
41:							
Golime	80	Very limited:		Somewhat limited:		Very limited:	
		Seepage	1.00	Slope	0.16	Content of large stones	1.00
		Cobble content	1.00			Seepage	0.22
		Slope	0.16			Slope	0.16
42:							
Grobutte	90	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
						Gravel content	1.00
43:							
Haploborolls	60	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Cobble content	0.17			Content of large stones	0.50
Rock outcrop	30	Not rated		Not rated		Not rated	

Table 11b.--Sanitary Facilities--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill: Rating class and limiting features	Value	Area sanitary landfill: Rating class and limiting features	Value	Daily cover for landfill: Rating class and limiting features	Value
44:							
Happle	80	Not limited		Not limited		Very limited:	
						Gravel content	1.00
						Seepage	0.22
45:							
Happle	80	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Gravel content	1.00
						Slope	1.00
						Seepage	0.22
46:							
Happle	50	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
						Gravel content	1.00
						Seepage	0.22
Rock outcrop	35	Not rated		Not rated		Not rated	
47:							
Hesperus	35	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Clayey	0.50			Too clayey	0.50
Empedrado	30	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
Pagoda	20	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Clayey	0.50			Too clayey	0.50
48:							
Hesperus	35	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Clayey	0.50			Too clayey	0.50
Empedrado	30	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
Pagoda	20	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Clayey	0.50			Too clayey	0.50
49:							
Hesperus	45	Somewhat limited:		Not limited		Somewhat limited:	
		Clayey	0.50			Too clayey	0.50
Pagoda	40	Somewhat limited:		Not limited		Somewhat limited:	
		Clayey	0.50			Too clayey	0.50
50:							
Irigul	40	Very limited:		Very limited:		Very limited:	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Slope	1.00	Slope	1.00	Slope	1.00
						Gravel content	0.96
Starman	30	Very limited:		Very limited:		Very limited:	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Slope	1.00	Slope	1.00	Slope	1.00
		Cobble content	0.01			Gravel content	0.84

Table 11b.--Sanitary Facilities--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill: Rating class and limiting features	Value	Area sanitary landfill: Rating class and limiting features	Value	Daily cover for landfill: Rating class and limiting features	Value
51:							
Mesa	50	Not limited		Not limited		Not limited	
Avalon	35	Not limited		Not limited		Not limited	
52:							
Northwater	50	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
				Seepage	1.00		
Adel	40	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Clayey	0.50			Too clayey	0.50
53:							
Pagoda	50	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Clayey	0.50			Too clayey	0.50
Hesperus	20	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Clayey	0.50			Too clayey	0.50
54:							
Panitchen	85	Not limited		Not limited		Somewhat limited:	
						Seepage	0.22
55:							
Parachute	60	Very limited:		Very limited:		Very limited:	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Slope	1.00	Slope	1.00	Slope	1.00
						Gravel content	0.01
Irigul	30	Very limited:		Very limited:		Very limited:	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Slope	1.00	Slope	1.00	Slope	1.00
						Gravel content	0.96
56:							
Parachute	35	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
						Gravel content	0.01
Irigul	30	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Slope	1.00
						Gravel content	0.96
Rhone	20	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	0.42	Depth to bedrock	0.42
						Gravel content	0.28
57:							
Parachute	55	Very limited:		Very limited:		Very limited:	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Slope	1.00	Slope	1.00	Slope	1.00
						Gravel content	0.01

Table 11b.--Sanitary Facilities--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill: Rating class and limiting features	Value	Area sanitary landfill: Rating class and limiting features	Value	Daily cover for landfill: Rating class and limiting features	Value
57:							
Rhone	35	Very limited:		Very limited:		Very limited:	
		Depth to bedrock	1.00	Slope	1.00	Slope	1.00
		Slope	1.00	Depth to bedrock	0.42	Depth to bedrock	0.42
						Gravel content	0.28
58:							
Peninsula	80	Not limited		Not limited		Not limited	
59:							
Persayo	85	Very limited:		Somewhat limited:		Very limited:	
		Depth to bedrock	1.00	Slope	0.96	Depth to bedrock	1.00
		Slope	0.96			Slope	0.96
60:							
Redcreek	60	Very limited:		Very limited:		Very limited:	
		Depth to bedrock	1.00	Slope	1.00	Depth to bedrock	1.00
		Slope	1.00			Slope	1.00
						Seepage	0.52
Rentsac	30	Very limited:		Very limited:		Very limited:	
		Depth to bedrock	1.00	Slope	1.00	Depth to bedrock	1.00
		Slope	1.00			Slope	1.00
						Gravel content	0.93
						Seepage	0.52
61:							
Rock outcrop	65	Not rated		Not rated		Not rated	
Torriorthents	30	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Depth to bedrock	1.00
		Depth to bedrock	1.00			Slope	1.00
						Gravel content	0.37
						Seepage	0.22
62:							
Shawa	85	Somewhat limited:		Somewhat limited:		Somewhat limited:	
		Slope	0.63	Slope	0.63	Slope	0.63
63:							
Silas	85	Very limited:		Somewhat limited:		Somewhat limited:	
		Depth to saturated zone	1.00	Flooding	0.40	Too clayey	0.50
		Clayey	0.50	Depth to saturated zone	0.02		
		Flooding	0.40				
64:							
Torrifluvents	40	Very limited:		Very limited:		Somewhat limited:	
		Flooding	1.00	Flooding	1.00	Seepage	0.16
Gullied land	40	Not rated		Not rated		Not rated	
65:							
Torriorthents	50	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00			Depth to bedrock	1.00
						Gravel content	0.38
						Seepage	0.22
Rock outcrop	40	Not rated		Not rated		Not rated	

Table 11b.--Sanitary Facilities--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill: Rating class and limiting features	Value	Area sanitary landfill: Rating class and limiting features	Value	Daily cover for landfill: Rating class and limiting features	Value
66:							
Torriorthents	50	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00			Depth to bedrock	1.00
						Gravel content	0.38
						Seepage	0.22
Rock outcrop	40	Not rated		Not rated		Not rated	
67:							
Tosca	80	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Seepage	1.00			Gravel content	1.00
68:							
Trail	90	Somewhat limited:		Somewhat limited:		Very limited:	
		Too sandy	0.50	Flooding	0.40	Seepage	1.00
		Flooding	0.40			Too sandy	0.50
69:							
Travessilla	45	Very limited:		Very limited:		Very limited:	
		Depth to bedrock	1.00	Slope	1.00	Depth to bedrock	1.00
		Slope	1.00			Slope	1.00
Rock outcrop	40	Not rated		Not rated		Not rated	
70:							
Uffens	85	Not limited		Not limited		Not limited	
71:							
Utso	60	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
						Gravel content	1.00
Rock outcrop	25	Not rated		Not rated		Not rated	
72:							
Wesdy	70	Very limited:		Very limited:		Very limited:	
		Clayey	1.00	Slope	1.00	Too clayey	1.00
		Cobble content	1.00			Slope	1.00
		Slope	1.00			Content of large stones	0.95
73:							
Wesdy	45	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Clayey	1.00			Too clayey	1.00
		Cobble content	1.00			Content of large stones	0.95
Northwater	40	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
				Seepage	1.00		
74:							
Winnemucca	60	Very limited:		Not limited		Very limited:	
		Clayey	1.00			Too clayey	1.00
		Cobble content	0.32				

Table 11b.--Sanitary Facilities--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill: Rating class and limiting features	Value	Area sanitary landfill: Rating class and limiting features	Value	Daily cover for landfill: Rating class and limiting features	Value
74:							
Castino	30	Very limited:		Very limited:		Very limited:	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Clayey	0.50			Too clayey	0.50
		Cobble content	0.26				
75:							
Wrayha	35	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
Rabbitex	20	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
Veatch	20	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
						Gravel content	0.02
76:							
Wrayha	45	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
Veatch	25	Very limited:		Very limited:		Very limited:	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Slope	1.00	Slope	1.00	Slope	1.00
						Gravel content	0.02
Rabbitex	20	Very limited:		Very limited:		Very limited:	
		Slope	1.00	Slope	1.00	Slope	1.00
77:							
Yamo	55	Somewhat limited:		Somewhat limited:		Somewhat limited:	
		Slope	0.96	Slope	0.96	Slope	0.96
Redcreek	35	Very limited:		Somewhat limited:		Very limited:	
		Depth to bedrock	1.00	Slope	0.96	Depth to bedrock	1.00
		Slope	0.96			Slope	0.96
						Seepage	0.52
78:							
Youngston	90	Not limited		Not limited		Not limited	
79:							
Water	100	Not rated		Not rated		Not rated	

Table 12a.--Construction Materials

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.00 to 0.99. The smaller the value, the greater the potential limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct. of map unit	Potential source of gravel		Potential source of sand		Potential source of topsoil	
		Rating class	Value	Rating class	Value	Rating class and limiting features	Value
1:							
Aga	85	Probable:		Improbable:		Poor:	
		Thickest layer not a source	0.00	Bottom layer not a source	0.00	Hard to reclaim	0.00
		Bottom layer	0.34	Thickest layer not a source	0.00		
2:							
Badland	80	Not rated		Not rated		Not rated	
3:							
Barx	85	Improbable:		Improbable:		Fair:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Carbonate content	0.92
		Thickest layer not a source	0.00	Thickest layer not a source	0.00		
4:							
Barx	60	Improbable:		Improbable:		Fair:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Carbonate content	0.92
		Thickest layer not a source	0.00	Thickest layer not a source	0.00		
Clapper	25	Improbable:		Improbable:		Poor:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Rock fragment content	0.00
		Thickest layer not a source	0.00	Thickest layer not a source	0.00	Hard to reclaim	0.00
						Carbonate content	0.46
5:							
Battlement	90	Improbable:		Improbable:		Good	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00		
		Thickest layer not a source	0.00	Thickest layer not a source	0.00		
6:							
Battlement	90	Improbable:		Probable:		Fair:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Salinity	0.50
		Thickest layer not a source	0.00	Thickest layer	0.03		
7:							
Biedsaw	45	Improbable:		Improbable:		Poor:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Slope	0.00
		Thickest layer not a source	0.00	Thickest layer not a source	0.00	Too clayey	0.48

Table 12a.--Construction Materials--Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel: Rating class	Value	Potential source of sand: Rating class	Value	Potential source of topsoil: Rating class and limiting features	Value
7:							
Sunup	25	Improbable:		Improbable:		Poor:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Slope	0.00
		Thickest layer not a source	0.00	Thickest layer not a source	0.00	Depth to bedrock	0.00
						Rock fragment content	0.00
8:							
Billings	90	Improbable:		Probable:		Fair:	
		Bottom layer not a source	0.00	Thickest layer not a source	0.00	Carbonate content	0.92
		Thickest layer not a source	0.00	Bottom layer	0.03	Sodium content	0.98
9:							
Bookcliff	45	Improbable:		Improbable:		Poor:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Hard to reclaim	0.00
		Thickest layer not a source	0.00	Thickest layer not a source	0.00	Slope	0.04
						Rock fragment content	0.12
Utso	40	Probable:		Improbable:		Poor:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Rock fragment content	0.00
		Thickest layer	0.19	Thickest layer not a source	0.00	Hard to reclaim	0.00
						Slope	0.04
10:							
Borollic Calciorthids	80	Improbable:		Improbable:		Poor:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Slope	0.00
		Thickest layer not a source	0.00	Thickest layer not a source	0.00	Carbonate content	0.01
						Salinity	0.50
11:							
Borpark	70	Improbable:		Improbable:		Poor:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Rock fragment content	0.00
		Thickest layer not a source	0.00	Thickest layer not a source	0.00	Slope	0.00
						Hard to reclaim	0.00
12:							
Bunkwater	85	Improbable:		Improbable:		Poor:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Sodium content	0.00
		Thickest layer not a source	0.00	Thickest layer not a source	0.00	Salinity	0.50
13:							
Caballo	85	Probable:		Improbable:		Poor:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Slope	0.00
		Thickest layer	0.06	Thickest layer not a source	0.00	Hard to reclaim	0.00
						Rock fragment content	0.00

Table 12a.--Construction Materials--Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel		Potential source of sand		Potential source of topsoil	
		Rating class	Value	Rating class	Value	Rating class and limiting features	Value
14:							
Callings	90	Improbable:		Improbable:		Poor:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Rock fragment content	0.00
		Thickest layer not a source	0.00	Thickest layer not a source	0.00	Hard to reclaim	0.00
						Too clayey	0.36
15:							
Cameo	90	Improbable:		Probable:		Good	
		Bottom layer not a source	0.00	Thickest layer	0.03		
		Thickest layer not a source	0.00	Bottom layer	0.06		
16:							
Castino	40	Improbable:		Improbable:		Fair:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Depth to bedrock	0.58
		Thickest layer not a source	0.00	Thickest layer not a source	0.00		
Skisams	25	Improbable:		Improbable:		Poor:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Depth to bedrock	0.00
		Thickest layer not a source	0.00	Thickest layer not a source	0.00		
Winnemucca	20	Improbable:		Improbable:		Poor:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Hard to reclaim	0.00
		Thickest layer not a source	0.00	Thickest layer not a source	0.00		
17:							
Cathedral	40	Improbable:		Improbable:		Poor:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Depth to bedrock	0.00
		Thickest layer not a source	0.00	Thickest layer not a source	0.00	Slope	0.00
						Rock fragment content	0.00
Veatch	40	Probable:		Improbable:		Poor:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Rock fragment content	0.00
		Thickest layer	0.12	Thickest layer not a source	0.00	Slope	0.00
						Depth to bedrock	0.58
18:							
Cerro	80	Improbable:		Improbable:		Poor:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Too clayey	0.00
		Thickest layer not a source	0.00	Thickest layer not a source	0.00		
19:							
Cerro	70	Improbable:		Improbable:		Poor:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Too clayey	0.00
		Thickest layer not a source	0.00	Thickest layer not a source	0.00	Slope	0.96

Table 12a.--Construction Materials--Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel: Rating class	Value	Potential source of sand: Rating class	Value	Potential source of topsoil: Rating class and limiting features	Value
20:							
Cerro	80	Improbable:		Improbable:		Poor:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Too clayey	0.00
		Thickest layer not a source	0.00	Thickest layer not a source	0.00	Slope	0.00
21:							
Chipeta	85	Improbable:		Improbable:		Poor:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Slope	0.00
		Thickest layer not a source	0.00	Thickest layer not a source	0.00	Depth to bedrock	0.00
						Too clayey	0.29
						Salinity	0.50
22:							
Clapper	85	Improbable:		Improbable:		Poor:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Slope	0.00
		Thickest layer not a source	0.00	Thickest layer not a source	0.00	Rock fragment content	0.00
						Hard to reclaim	0.00
						Carbonate content	0.46
23:							
Clapper	85	Improbable:		Improbable:		Poor:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Slope	0.00
		Thickest layer not a source	0.00	Thickest layer not a source	0.00	Rock fragment content	0.00
						Hard to reclaim	0.00
						Carbonate content	0.46
24:							
Cochetopa	50	Improbable:		Improbable:		Poor:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Slope	0.00
		Thickest layer not a source	0.00	Thickest layer not a source	0.00		
Clayburn	20	Improbable:		Improbable:		Poor:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Slope	0.00
		Thickest layer not a source	0.00	Thickest layer not a source	0.00		
25:							
Cowestglen	90	Improbable:		Probable:		Fair:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Sodium content	0.98
		Thickest layer not a source	0.00	Thickest layer	0.08		
26:							
Cryochrepts	35	Improbable:		Improbable:		Poor:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Slope	0.00
		Thickest layer not a source	0.00	Thickest layer not a source	0.00	Rock fragment content	0.00
						Hard to reclaim	0.12

Table 12a.--Construction Materials--Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel: Rating class	Value	Potential source of sand: Rating class	Value	Potential source of topsoil: Rating class and limiting features	Value
26:							
Cryoborolls	30	Improbable:		Improbable:		Poor:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Rock fragment content	0.00
		Thickest layer not a source	0.00	Thickest layer not a source	0.00	Slope	0.00
						Depth to bedrock	0.00
Rubble land	25	Not rated		Not rated		Not rated	
27:							
Cryorthents	55	Probable:		Improbable:		Poor:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Rock fragment content	0.00
		Thickest layer	0.37	Thickest layer not a source	0.00	Slope	0.00
						Depth to bedrock	0.16
Rock outcrop	30	Not rated		Not rated		Not rated	
28:							
Cumulic Haploborolls	90	Probable:		Improbable:		Poor:	
		Bottom layer	0.12	Bottom layer not a source	0.00	Hard to reclaim	0.00
		Thickest layer	0.19	Thickest layer not a source	0.00	Rock fragment content	0.00
29:							
Debeque	85	Probable:		Improbable:		Poor:	
		Thickest layer not a source	0.00	Bottom layer not a source	0.00	Rock fragment content	0.00
		Bottom layer	0.75	Thickest layer not a source	0.00	Hard to reclaim	0.00
						Slope	0.16
30:							
Debeque	40	Probable:		Improbable:		Poor:	
		Thickest layer not a source	0.00	Bottom layer not a source	0.00	Slope	0.00
		Bottom layer	0.75	Thickest layer not a source	0.00	Hard to reclaim	0.00
						Rock fragment content	0.00
Hesperus	35	Improbable:		Improbable:		Fair:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Slope	0.84
		Thickest layer not a source	0.00	Thickest layer not a source	0.00		
31:							
Dominguez	85	Improbable:		Improbable:		Poor:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Too clayey	0.00
		Thickest layer not a source	0.00	Thickest layer not a source	0.00		
32:							
Dominguez	80	Improbable:		Improbable:		Poor:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Too clayey	0.00
		Thickest layer not a source	0.00	Thickest layer not a source	0.00		

Table 12a.--Construction Materials--Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel: Rating class	Value	Potential source of sand: Rating class	Value	Potential source of topsoil: Rating class and limiting features	Value
33:							
Emmons	30	Improbable:		Improbable:		Fair:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Slope	0.16
		Thickest layer not a source	0.00	Thickest layer not a source	0.00	Carbonate content	0.80
Cerro	25	Improbable:		Improbable:		Poor:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Slope	0.00
		Thickest layer not a source	0.00	Thickest layer not a source	0.00	Too clayey	0.00
Pagoda	25	Improbable:		Improbable:		Poor:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Slope	0.00
		Thickest layer not a source	0.00	Thickest layer not a source	0.00	Too clayey	0.29
34:							
Empedrado	80	Improbable:		Improbable:		Poor:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Slope	0.00
		Thickest layer not a source	0.00	Thickest layer not a source	0.00		
35:							
Empedrado	35	Improbable:		Improbable:		Poor:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Slope	0.00
		Thickest layer not a source	0.00	Thickest layer not a source	0.00		
Pagoda	30	Improbable:		Improbable:		Poor:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Slope	0.00
		Thickest layer not a source	0.00	Thickest layer not a source	0.00	Too clayey	0.29
Godding	25	Improbable:		Improbable:		Poor:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Too clayey	0.00
		Thickest layer not a source	0.00	Thickest layer not a source	0.00	Slope	0.00
						Hard to reclaim	0.00
						Rock fragment content	0.00
36:							
Fluvaquents	80	Improbable:		Probable:		Poor:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Rock fragment content	0.00
		Thickest layer not a source	0.00	Thickest layer	0.01	Hard to reclaim	0.68
						Depth to saturated zone	0.76
37:							
Fughes	90	Improbable:		Improbable:		Fair:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Too clayey	0.72
		Thickest layer not a source	0.00	Thickest layer not a source	0.00		

Table 12a.--Construction Materials--Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel: Rating class	Value	Potential source of sand: Rating class	Value	Potential source of topsoil: Rating class and limiting features	Value
38:							
Fughes	90	Improbable:		Improbable:		Fair:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Too clayey	0.72
		Thickest layer not a source	0.00	Thickest layer not a source	0.00		
39:							
Fughes	60	Improbable:		Improbable:		Fair:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Too clayey	0.72
		Thickest layer not a source	0.00	Thickest layer not a source	0.00		
Hesperus	25	Improbable:		Improbable:		Good	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00		
		Thickest layer not a source	0.00	Thickest layer not a source	0.00		
40:							
Godding	75	Improbable:		Improbable:		Poor:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Too clayey	0.00
		Thickest layer not a source	0.00	Thickest layer not a source	0.00	Slope	0.00
						Hard to reclaim	0.00
						Rock fragment content	0.00
41:							
Golime	80	Improbable:		Improbable:		Poor:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Rock fragment content	0.00
		Thickest layer not a source	0.00	Thickest layer not a source	0.00	Hard to reclaim	0.00
						Slope	0.84
42:							
Grobutte	90	Probable:		Improbable:		Poor:	
		Bottom layer	0.12	Bottom layer not a source	0.00	Slope	0.00
		Thickest layer	0.12	Thickest layer not a source	0.00	Hard to reclaim	0.00
						Rock fragment content	0.00
43:							
Haploborolls	60	Improbable:		Improbable:		Poor:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Slope	0.00
		Thickest layer not a source	0.00	Thickest layer not a source	0.00	Rock fragment content	0.00
						Depth to bedrock	0.90
Rock outcrop	30	Not rated		Not rated		Not rated	
44:							
Happle	80	Probable:		Improbable:		Poor:	
		Thickest layer	0.19	Bottom layer not a source	0.00	Hard to reclaim	0.00
		Bottom layer	0.75	Thickest layer not a source	0.00	Rock fragment content	0.00

Table 12a.--Construction Materials--Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel: Rating class	Value	Potential source of sand: Rating class	Value	Potential source of topsoil: Rating class and limiting features	Value
45:							
Happle	80	Probable:		Improbable:		Poor:	
		Thickest layer	0.19	Bottom layer not a source	0.00	Slope	0.00
		Bottom layer	0.75	Thickest layer not a source	0.00	Hard to reclaim	0.00
						Rock fragment content	0.00
46:							
Happle	50	Probable:		Improbable:		Poor:	
		Thickest layer	0.19	Bottom layer not a source	0.00	Slope	0.00
		Bottom layer	0.75	Thickest layer not a source	0.00	Hard to reclaim	0.00
						Rock fragment content	0.00
Rock outcrop	35	Not rated		Not rated		Not rated	
47:							
Hesperus	35	Improbable:		Improbable:		Poor:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Slope	0.00
		Thickest layer not a source	0.00	Thickest layer not a source	0.00		
Empedrado	30	Improbable:		Improbable:		Poor:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Slope	0.00
		Thickest layer not a source	0.00	Thickest layer not a source	0.00		
Pagoda	20	Improbable:		Improbable:		Poor:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Slope	0.00
		Thickest layer not a source	0.00	Thickest layer not a source	0.00	Too clayey	0.29
48:							
Hesperus	35	Improbable:		Improbable:		Poor:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Slope	0.00
		Thickest layer not a source	0.00	Thickest layer not a source	0.00		
Empedrado	30	Improbable:		Improbable:		Poor:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Slope	0.00
		Thickest layer not a source	0.00	Thickest layer not a source	0.00		
Pagoda	20	Improbable:		Improbable:		Poor:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Slope	0.00
		Thickest layer not a source	0.00	Thickest layer not a source	0.00	Too clayey	0.29

Table 12a.--Construction Materials--Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel: Rating class	Value	Potential source of sand: Rating class	Value	Potential source of topsoil: Rating class and limiting features	Value
49:							
Hesperus	45	Improbable:		Improbable:		Good	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00		
		Thickest layer not a source	0.00	Thickest layer not a source	0.00		
Pagoda	40	Improbable:		Improbable:		Fair:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Too clayey	0.29
		Thickest layer not a source	0.00	Thickest layer not a source	0.00		
50:							
Irigul	40	Improbable:		Improbable:		Poor:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Slope	0.00
						Depth to bedrock	0.00
		Thickest layer not a source	0.00	Thickest layer not a source	0.00	Rock fragment content	0.00
Starman	30	Improbable:		Improbable:		Poor:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Slope	0.00
						Depth to bedrock	0.00
		Thickest layer not a source	0.00	Thickest layer not a source	0.00	Rock fragment content	0.00
51:							
Mesa	50	Probable:		Improbable:		Poor:	
		Thickest layer not a source	0.00	Bottom layer not a source	0.00	Hard to reclaim	0.00
						Too clayey	0.51
		Bottom layer	0.12	Thickest layer not a source	0.00		
Avalon	35	Improbable:		Improbable:		Fair:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Carbonate content	0.46
						Hard to reclaim	0.68
		Thickest layer not a source	0.00	Thickest layer not a source	0.00	Rock fragment content	0.88
52:							
Northwater	50	Probable:		Improbable:		Poor:	
		Thickest layer not a source	0.00	Bottom layer not a source	0.00	Slope	0.00
						Hard to reclaim	0.00
		Bottom layer	0.19	Thickest layer not a source	0.00		
Adel	40	Improbable:		Improbable:		Poor:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Slope	0.00
		Thickest layer not a source	0.00	Thickest layer not a source	0.00		
53:							
Pagoda	50	Improbable:		Improbable:		Poor:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Slope	0.00
						Too clayey	0.29
		Thickest layer not a source	0.00	Thickest layer not a source	0.00		

Table 12a.--Construction Materials--Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel: Rating class	Value	Potential source of sand: Rating class	Value	Potential source of topsoil: Rating class and limiting features	Value
53:							
Hesperus	20	Improbable:		Improbable:		Poor:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Slope	0.00
		Thickest layer not a source	0.00	Thickest layer not a source	0.00		
54:							
Panitchen	85	Improbable:		Improbable:		Poor:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Rock fragment content	0.00
		Thickest layer not a source	0.00	Thickest layer not a source	0.00	Salinity	0.88
55:							
Parachute	60	Improbable:		Improbable:		Poor:	
		Thickest layer not a source	0.00	Bottom layer not a source	0.00	Rock fragment content	0.00
		Bottom layer not a source	0.00	Thickest layer not a source	0.00	Slope	0.00
						Depth to bedrock	0.58
Irigul	30	Improbable:		Improbable:		Poor:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Slope	0.00
		Thickest layer not a source	0.00	Thickest layer not a source	0.00	Depth to bedrock	0.00
						Rock fragment content	0.00
56:							
Parachute	35	Improbable:		Improbable:		Poor:	
		Thickest layer not a source	0.00	Bottom layer not a source	0.00	Rock fragment content	0.00
		Bottom layer not a source	0.00	Thickest layer not a source	0.00	Slope	0.00
						Depth to bedrock	0.58
Irigul	30	Improbable:		Improbable:		Poor:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Depth to bedrock	0.00
		Thickest layer not a source	0.00	Thickest layer not a source	0.00	Slope	0.00
						Rock fragment content	0.00
Rhone	20	Improbable:		Improbable:		Poor:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Slope	0.00
		Thickest layer not a source	0.00	Thickest layer not a source	0.00	Hard to reclaim	0.00
						Rock fragment content	0.00
57:							
Parachute	55	Improbable:		Improbable:		Poor:	
		Thickest layer not a source	0.00	Bottom layer not a source	0.00	Rock fragment content	0.00
		Bottom layer not a source	0.00	Thickest layer not a source	0.00	Slope	0.00
						Depth to bedrock	0.58
Rhone	35	Improbable:		Improbable:		Poor:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Slope	0.00
		Thickest layer not a source	0.00	Thickest layer not a source	0.00	Hard to reclaim	0.00
						Rock fragment content	0.00

Table 12a.--Construction Materials--Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel: Rating class	Value	Potential source of sand: Rating class	Value	Potential source of topsoil: Rating class and limiting features	Value
58:							
Peninsula	80	Improbable:		Improbable:		Fair:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Hard to reclaim	0.96
		Thickest layer not a source	0.00	Thickest layer not a source	0.00		
59:							
Persayo	85	Improbable:		Improbable:		Poor:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Depth to bedrock	0.00
						Slope	0.04
		Thickest layer not a source	0.00	Thickest layer not a source	0.00	Sodium content	0.98
60:							
Redcreek	60	Improbable:		Improbable:		Poor:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Slope	0.00
						Depth to bedrock	0.00
		Thickest layer not a source	0.00	Thickest layer not a source	0.00		
Rentsac	30	Improbable:		Improbable:		Poor:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Slope	0.00
						Depth to bedrock	0.00
		Thickest layer not a source	0.00	Thickest layer not a source	0.00	Rock fragment content	0.00
61:							
Rock outcrop	65	Not rated		Not rated		Not rated	
Torriorthents	30	Improbable:		Improbable:		Poor:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Rock fragment content	0.00
		Thickest layer not a source	0.00	Thickest layer not a source	0.00	Slope	0.00
						Depth to bedrock	0.00
						Salinity	0.50
62:							
Shawa	85	Improbable:		Improbable:		Fair:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Slope	0.37
		Thickest layer not a source	0.00	Thickest layer not a source	0.00		
63:							
Silas	85	Improbable:		Improbable:		Good	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00		
		Thickest layer not a source	0.00	Thickest layer not a source	0.00		
64:							
Torrifluvents	40	Improbable:		Improbable:		Fair:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Salinity	0.50
		Thickest layer not a source	0.00	Thickest layer not a source	0.00	Rock fragment content	0.88
Gullied land	40	Not rated		Not rated		Not rated	

Table 12a.--Construction Materials--Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel: Rating class	Value	Potential source of sand: Rating class	Value	Potential source of topsoil: Rating class and limiting features	Value
65:							
Torriorthents	50	Improbable:		Improbable:		Poor:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Depth to bedrock	0.00
		Thickest layer not a source	0.00	Thickest layer not a source	0.00	Slope	0.00
						Rock fragment content	0.00
						Salinity	0.50
Rock outcrop	40	Not rated		Not rated		Not rated	
66:							
Torriorthents	50	Improbable:		Improbable:		Poor:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Depth to bedrock	0.00
		Thickest layer not a source	0.00	Thickest layer not a source	0.00	Slope	0.00
						Rock fragment content	0.00
						Salinity	0.50
Rock outcrop	40	Not rated		Not rated		Not rated	
67:							
Tosca	80	Probable:		Improbable:		Poor:	
		Bottom layer	0.06	Bottom layer not a source	0.00	Hard to reclaim	0.00
		Thickest layer	0.25	Thickest layer not a source	0.00	Rock fragment content	0.00
						Slope	0.00
						Carbonate content	0.46
68:							
Trail	90	Improbable:		Probable:		Fair:	
		Bottom layer not a source	0.00	Bottom layer	0.11	Too sandy	0.94
		Thickest layer not a source	0.00	Thickest layer	0.16		
69:							
Travessilla	45	Improbable:		Improbable:		Poor:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Slope	0.00
		Thickest layer not a source	0.00	Thickest layer not a source	0.00	Depth to bedrock	0.00
Rock outcrop	40	Not rated		Not rated		Not rated	
70:							
Uffens	85	Improbable:		Probable:		Poor:	
		Bottom layer not a source	0.00	Thickest layer not a source	0.00	Sodium content	0.00
		Thickest layer not a source	0.00	Bottom layer	0.08	Salinity	0.50
						Carbonate content	0.92
71:							
Utso	60	Probable:		Improbable:		Poor:	
		Thickest layer	0.19	Bottom layer not a source	0.00	Slope	0.00
		Bottom layer	0.31	Thickest layer not a source	0.00	Hard to reclaim	0.00
						Rock fragment content	0.00
Rock outcrop	25	Not rated		Not rated		Not rated	

Table 12a.--Construction Materials--Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel		Potential source of sand		Potential source of topsoil	
		Rating class	Value	Rating class	Value	Rating class and limiting features	Value
72:							
Wesdy	70	Improbable:		Improbable:		Poor:	
		Bottom layer not		Bottom layer not		Slope	0.00
		a source	0.00	a source	0.00	Rock fragment	
		Thickest layer		Thickest layer		content	0.00
		not a source	0.00	not a source	0.00	Hard to reclaim	0.00
						Too clayey	0.09
73:							
Wesdy	45	Improbable:		Improbable:		Poor:	
		Bottom layer not		Bottom layer not		Slope	0.00
		a source	0.00	a source	0.00	Rock fragment	0.00
		Thickest layer		Thickest layer		content	
		not a source	0.00	not a source	0.00	Hard to reclaim	0.00
						Too clayey	0.09
Northwater	40	Probable:		Improbable:		Poor:	
		Thickest layer		Bottom layer not		Slope	0.00
		not a source	0.00	a source	0.00	Hard to reclaim	0.00
		Bottom layer	0.19	Thickest layer			
				not a source	0.00		
74:							
Winnemucca	60	Improbable:		Improbable:		Poor:	
		Bottom layer not		Bottom layer not		Hard to reclaim	0.00
		a source	0.00	a source	0.00		
		Thickest layer		Thickest layer			
		not a source	0.00	not a source	0.00		
Castino	30	Improbable:		Improbable:		Fair:	
		Bottom layer not		Bottom layer not		Depth to bedrock	0.58
		a source	0.00	a source	0.00		
		Thickest layer		Thickest layer			
		not a source	0.00	not a source	0.00		
75:							
Wrayha	35	Improbable:		Improbable:		Poor:	
		Bottom layer not		Bottom layer not		Slope	0.00
		a source	0.00	a source	0.00	Too clayey	0.51
		Thickest layer		Thickest layer			
		not a source	0.00	not a source	0.00		
Rabbitex	20	Improbable:		Improbable:		Poor:	
		Bottom layer not		Bottom layer not		Slope	0.00
		a source	0.00	a source	0.00	Rock fragment	
		Thickest layer		Thickest layer		content	0.12
		not a source	0.00	not a source	0.00	Carbonate content	0.80
Veatch	20	Probable:		Improbable:		Poor:	
		Bottom layer not		Bottom layer not		Rock fragment	
		a source	0.00	a source	0.00	content	0.00
		Thickest layer	0.12	Thickest layer		Slope	0.00
				not a source	0.00	Depth to bedrock	0.58

Table 12a.--Construction Materials--Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel: Rating class	Value	Potential source of sand: Rating class	Value	Potential source of topsoil: Rating class and limiting features	Value
76:							
Wrayha	45	Improbable:		Improbable:		Poor:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Slope	0.00
		Thickest layer not a source	0.00	Thickest layer not a source	0.00	Too clayey	0.51
Veatch	25	Probable:		Improbable:		Poor:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Rock fragment content	0.00
		Thickest layer	0.12	Thickest layer not a source	0.00	Slope	0.00
						Depth to bedrock	0.58
Rabbitex	20	Improbable:		Improbable:		Poor:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Slope	0.00
		Thickest layer not a source	0.00	Thickest layer not a source	0.00	Rock fragment content	0.12
						Carbonate content	0.80
77:							
Yamo	55	Improbable:		Probable:		Fair:	
		Bottom layer not a source	0.00	Thickest layer	0.03	Slope	0.04
		Thickest layer not a source	0.00	Bottom layer	0.08		
Redcreek	35	Improbable:		Improbable:		Poor:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Depth to bedrock	0.00
		Thickest layer not a source	0.00	Thickest layer not a source	0.00	Slope	0.04
78:							
Youngston	90	Improbable:		Improbable:		Fair:	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00	Salinity	0.88
		Thickest layer not a source	0.00	Thickest layer not a source	0.00	Sodium content	0.98
79:							
Water	100	Not rated		Not rated		Not rated	

Table 12b.--Construction Materials

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.00 to 0.99. The smaller the value, the greater the potential limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material: Rating class and limiting features	Value	Potential source of roadfill: Rating class and limiting features	Value
1:					
Aga	85	Fair:		Good	
		Droughty	0.10		
		Low content of organic matter	0.12		
2:					
Badland	80	Not rated		Not rated	
3:					
Barx	85	Fair:		Good	
		Low content of organic matter	0.12		
		Water erosion	0.90		
		Carbonate content	0.92		
4:					
Barx	60	Fair:		Good	
		Low content of organic matter	0.12		
		Water erosion	0.90		
		Carbonate content	0.92		
Clapper	25	Fair:		Fair:	
		Low content of organic matter	0.12	Cobble content	0.09
		Carbonate content	0.46	Stone content	0.78
		Droughty	0.71		
		Cobble content	0.86		
		Stone content	0.96		
5:					
Battlement	90	Fair:		Good	
		Low content of organic matter	0.88		
		No water erosion limitation	0.99		
6:					
Battlement	90	Fair:		Good	
		Low content of organic matter	0.88		
		No water erosion limitation	0.99		
7:					
Biedsaw	45	Fair:		Poor:	
		Low content of organic matter	0.12	Slope	0.00
		Too clayey	0.82	Shrink-swell	0.87
		No water erosion limitation	0.99		

Table 12b.--Construction Materials--Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material: Rating class and limiting features	Value	Potential source of roadfill: Rating class and limiting features	Value
7:					
Sunup	25	Poor:		Poor:	
		Depth to bedrock	0.00	Depth to bedrock	0.00
		Droughty	0.00	Slope	0.00
		Low content of organic matter	0.88	Stone content	0.98
		Stone content	0.98		
8:					
Billings	90	Fair:		Poor:	
		Low content of organic matter	0.12	Low strength	0.00
		Carbonate content	0.92		
		Sodium content	0.97		
		No water erosion limitation	0.99		
9:					
Bookcliff	45	Fair:		Good	
		Carbonate content	0.16		
		Low content of organic matter	0.88		
Utso	40	Fair:		Fair:	
		Droughty	0.12	Depth to bedrock	0.58
		Low content of organic matter	0.88		
10:					
Borollic Calciorthids	80	Fair:		Poor:	
		Carbonate content	0.01	Slope	0.00
		Low content of organic matter	0.12		
		No water erosion limitation	0.99		
11:					
Borpark	70	Poor:		Poor:	
		Stone content	0.00	Stone content	0.00
		Cobble content	0.34	Slope	0.00
		Carbonate content	0.68	Cobble content	0.24
		Low content of organic matter	0.88	Shrink-swell	0.99
		Droughty	0.98		
12:					
Bunkwater	85	Poor:		Good	
		Sodium content	0.00		
		Too alkaline	0.00		
		Low content of organic matter	0.12		
13:					
Caballo	85	Poor:		Poor:	
		Droughty	0.00	Slope	0.00
		Stone content	0.32	Stone content	0.28
		Low content of organic matter	0.50	Cobble content	0.47
				Depth to bedrock	0.58

Table 12b.--Construction Materials--Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material: Rating class and limiting features	Value	Potential source of roadfill: Rating class and limiting features	Value
14:					
Callings	90	Fair:		Fair:	
		Too clayey	0.50	Cobble content	0.08
		Cobble content	0.50	Shrink-swell	0.92
		Low content of organic matter	0.88		
		Too acid	0.99		
		No water erosion limitation	0.99		
15:					
Cameo	90	Fair:		Good	
		Low content of organic matter	0.12		
16:					
Castino	40	Fair:		Poor:	
		Droughty	0.36	Depth to bedrock	0.00
		Depth to bedrock	0.58	Cobble content	0.61
				Shrink-swell	0.97
Skisams	25	Poor:		Poor:	
		Depth to bedrock	0.00	Depth to bedrock	0.00
		Droughty	0.00		
Winnemucca	20	Fair:		Fair:	
		Too acid	0.99	Cobble content	0.86
17:					
Cathedral	40	Poor:		Poor:	
		Droughty	0.00	Slope	0.00
		Depth to bedrock	0.00	Depth to bedrock	0.00
		Stone content	0.01	Stone content	0.01
Veatch	40	Poor:		Poor:	
		Droughty	0.00	Slope	0.00
		Low content of organic matter	0.12	Depth to bedrock	0.00
		Depth to bedrock	0.58	Stone content	0.87
		Stone content	0.87		
		No water erosion limitation	0.99		
18:					
Cerro	80	Poor:		Fair:	
		Too clayey	0.00	Shrink-swell	0.53
		Low content of organic matter	0.12		
		No water erosion limitation	0.99		
19:					
Cerro	70	Poor:		Fair:	
		Too clayey	0.00	Shrink-swell	0.53
		Low content of organic matter	0.12		
		No water erosion limitation	0.99		

Table 12b.--Construction Materials--Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material: Rating class and limiting features	Value	Potential source of roadfill: Rating class and limiting features	Value
20:					
Cerro	80	Poor:		Fair:	
		Too clayey	0.00	Shrink-swell	0.53
		Low content of organic matter	0.12	Slope	0.68
		No water erosion limitation	0.99		
21:					
Chipeta	85	Poor:		Poor:	
		Droughty	0.00	Depth to bedrock	0.00
		Depth to bedrock	0.00	Shrink-swell	0.87
		Low content of organic matter	0.12	Slope	0.92
		Too clayey	0.50		
		No water erosion limitation	0.99		
22:					
Clapper	85	Fair:		Fair:	
		Low content of organic matter	0.12	Cobble content	0.09
		Carbonate content	0.46	Slope	0.68
		Droughty	0.71	Stone content	0.78
		Cobble content	0.86		
		Stone content	0.96		
23:					
Clapper	85	Fair:		Poor:	
		Low content of organic matter	0.12	Slope	0.00
		Carbonate content	0.46	Cobble content	0.09
		Droughty	0.71	Stone content	0.78
		Cobble content	0.86		
		Stone content	0.96		
24:					
Cochetopa	50	Good		Poor:	
				Slope	0.00
				Shrink-swell	0.72
Clayburn	20	Good		Poor:	
				Slope	0.00
				Shrink-swell	0.98
25:					
Cowestglen	90	Fair:		Good	
		Low content of organic matter	0.88		
		Sodium content	0.97		

Table 12b.--Construction Materials--Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material: Rating class and limiting features	Value	Potential source of roadfill: Rating class and limiting features	Value
26:					
Cryochrepts	35	Poor:		Poor:	
		Stone content	0.00	Stone content	0.00
		Low content of organic matter	0.12	Slope	0.00
		Droughty	0.81	Cobble content	0.23
		Too acid	0.95		
		No cobble limitation	0.99		
Cryoborolls	30	Poor:		Poor:	
		Droughty	0.00	Depth to bedrock	0.00
		Depth to bedrock	0.00	Slope	0.00
				Cobble content	0.09
Rubble land	25	Not rated		Not rated	
27:					
Cryorthents	55	Poor:		Poor:	
		Droughty	0.00	Depth to bedrock	0.00
		Low content of organic matter	0.12	Slope	0.00
		Depth to bedrock	0.16		
Rock outcrop	30	Not rated		Not rated	
28:					
Cumulic Haploborolls	90	Fair:		Fair:	
		Droughty	0.62	Stone content	0.97
		Stone content	0.74		
29:					
Debeque	85	Poor:		Good	
		Droughty	0.00		
		Low content of organic matter	0.12		
30:					
Debeque	40	Poor:		Good	
		Droughty	0.00		
		Low content of organic matter	0.12		
Hesperus	35	Good		Fair:	
				Shrink-swell	0.87
31:					
Dominguez	85	Poor:		Fair:	
		Too clayey	0.00	Shrink-swell	0.12
		Low content of organic matter	0.12		
32:					
Dominguez	80	Poor:		Fair:	
		Too clayey	0.00	Shrink-swell	0.12
		Low content of organic matter	0.12		

Table 12b.--Construction Materials--Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material: Rating class and limiting features	Value	Potential source of roadfill: Rating class and limiting features	Value
33:					
Emmons	30	Poor:		Good	
		Too alkaline	0.00		
		Low content of organic matter	0.12		
		Water erosion	0.68		
		Carbonate content	0.80		
Cerro	25	Poor:		Fair:	
		Too clayey	0.00	Shrink-swell	0.53
		Low content of organic matter	0.12	Slope	0.82
		No water erosion limitation	0.99		
Pagoda	25	Fair:		Fair:	
		Low content of organic matter	0.12	Shrink-swell	0.75
		Too clayey	0.50	Slope	0.82
34:					
Empedrado	80	Fair:		Poor:	
		Low content of organic matter	0.12	Slope	0.00
		Water erosion	0.90		
35:					
Empedrado	35	Fair:		Fair:	
		Low content of organic matter	0.12	Slope	0.98
		Water erosion	0.90		
Pagoda	30	Fair:		Fair:	
		Low content of organic matter	0.12	Shrink-swell	0.75
		Too clayey	0.50	Slope	0.98
Godding	25	Poor:		Poor:	
		Stone content	0.00	Stone content	0.00
		Too clayey	0.00	Cobble content	0.15
		Cobble content	0.87	Slope	0.98
		Low content of organic matter	0.88		
		Droughty	0.99		
36:					
Fluvaquents	80	Fair:		Fair:	
		Low content of organic matter	0.12	Depth to saturated zone	0.76
37:					
Fughes	90	Fair:		Fair:	
		Too clayey	0.82	Shrink-swell	0.36
38:					
Fughes	90	Fair:		Fair:	
		Too clayey	0.82	Shrink-swell	0.36

Table 12b.--Construction Materials--Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material: Rating class and limiting features	Value	Potential source of roadfill: Rating class and limiting features	Value
39:					
Fughes	60	Fair:		Fair:	
		Too clayey	0.82	Shrink-swell	0.36
Hesperus	25	Good		Fair:	
				Shrink-swell	0.87
40:					
Godding	75	Poor:		Poor:	
		Stone content	0.00	Stone content	0.00
		Too clayey	0.00	Cobble content	0.20
		Low content of organic matter	0.88	Slope	0.92
		Cobble content	0.89		
		Droughty	0.99		
41:					
Golime	80	Poor:		Poor:	
		Stone content	0.00	Cobble content	0.00
		Low content of organic matter	0.12	Stone content	0.00
		Cobble content	0.43		
		Droughty	0.68		
42:					
Grobutte	90	Fair:		Poor:	
		Low content of organic matter	0.50	Slope	0.00
		Droughty	0.71		
43:					
Haploborolls	60	Poor:		Poor:	
		Stone content	0.00	Depth to bedrock	0.00
		Droughty	0.02	Slope	0.00
		Low content of organic matter	0.88	Stone content	0.00
		Depth to bedrock	0.90	Cobble content	0.83
Rock outcrop	30	Not rated		Not rated	
44:					
Happle	80	Fair:		Good	
		Droughty	0.04		
		Low content of organic matter	0.12		
45:					
Happle	80	Fair:		Fair:	
		Droughty	0.04	Slope	0.68
		Low content of organic matter	0.12		
46:					
Happle	50	Fair:		Poor:	
		Droughty	0.04	Slope	0.00
		Low content of organic matter	0.12		
Rock outcrop	35	Not rated		Not rated	

Table 12b.--Construction Materials--Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material: Rating class and limiting features	Value	Potential source of roadfill: Rating class and limiting features	Value
47:					
Hesperus	35	Good		Fair:	
				Slope	0.50
				Shrink-swell	0.87
Empedrado	30	Fair:		Fair:	
		Low content of organic matter	0.12	Slope	0.50
		Water erosion	0.90		
Pagoda	20	Fair:		Fair:	
		Low content of organic matter	0.12	Slope	0.50
		Too clayey	0.50	Shrink-swell	0.75
48:					
Hesperus	35	Good		Poor:	
				Slope	0.00
				Shrink-swell	0.87
Empedrado	30	Fair:		Poor:	
		Low content of organic matter	0.12	Slope	0.00
		Water erosion	0.90		
Pagoda	20	Fair:		Poor:	
		Low content of organic matter	0.12	Slope	0.00
		Too clayey	0.50	Shrink-swell	0.75
49:					
Hesperus	45	Good		Fair:	
				Shrink-swell	0.87
Pagoda	40	Fair:		Fair:	
		Low content of organic matter	0.12	Shrink-swell	0.75
		Too clayey	0.50		
50:					
Irigul	40	Poor:		Poor:	
		Droughty	0.00	Depth to bedrock	0.00
		Depth to bedrock	0.00	Slope	0.50
		Low content of organic matter	0.12		
Starman	30	Poor:		Poor:	
		Droughty	0.00	Depth to bedrock	0.00
		Depth to bedrock	0.00	Slope	0.50
		Low content of organic matter	0.88	No cobble limitation	0.99
51:					
Mesa	50	Fair:		Good	
		Low content of organic matter	0.12		
		Carbonate content	0.46		
		Too clayey	0.88		
		Stone content	0.89		

Table 12b.--Construction Materials--Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material: Rating class and limiting features	Value	Potential source of roadfill: Rating class and limiting features	Value
51:					
Avalon	35	Fair:		Good	
		Low content of organic matter	0.12		
		Carbonate content	0.46		
		Water erosion	0.90		
52:					
Northwater	50	Fair:		Poor:	
		Stone content	0.93	Slope	0.00
Adel	40	Good		Poor:	
				Slope	0.00
53:					
Pagoda	50	Fair:		Poor:	
		Low content of organic matter	0.12	Slope	0.00
				Shrink-swell	0.75
		Too clayey	0.50		
Hesperus	20	Good		Poor:	
				Slope	0.00
				Shrink-swell	0.87
54:					
Panitchen	85	Fair:		Good	
		Low content of organic matter	0.88		
		No water erosion limitation	0.99		
55:					
Parachute	60	Poor:		Poor:	
		Droughty	0.00	Depth to bedrock	0.00
		Depth to bedrock	0.58	Slope	0.82
Irigul	30	Poor:		Poor:	
		Droughty	0.00	Depth to bedrock	0.00
		Depth to bedrock	0.00	Slope	0.82
		Low content of organic matter	0.12		
56:					
Parachute	35	Poor:		Poor:	
		Droughty	0.00	Depth to bedrock	0.00
		Depth to bedrock	0.58	Slope	0.00
Irigul	30	Poor:		Poor:	
		Droughty	0.00	Depth to bedrock	0.00
		Depth to bedrock	0.00	Slope	0.00
		Low content of organic matter	0.12		
Rhone	20	Good		Poor:	
				Slope	0.00
				Depth to bedrock	0.58

Table 12b.--Construction Materials--Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material: Rating class and limiting features	Value	Potential source of roadfill: Rating class and limiting features	Value
57:					
Parachute-----------	55	Poor:		Poor:	
		Droughty	0.00	Depth to bedrock	0.00
		Depth to bedrock	0.58	Slope	0.82
Rhone---------------	35	Good		Fair:	
				Depth to bedrock	0.58
				Slope	0.82
58:					
Peninsula-----------	80	Fair:		Good	
		Low content of organic matter	0.12		
		Water erosion	0.90		
		Carbonate content	0.92		
59:					
Persayo-------------	85	Poor:		Poor:	
		Droughty	0.00	Depth to bedrock	0.00
		Depth to bedrock	0.00	Shrink-swell	0.87
		Low content of organic matter	0.12		
		Sodium content	0.97		
		No water erosion limitation	0.99		
60:					
Redcreek------------	60	Poor:		Poor:	
		Droughty	0.00	Depth to bedrock	0.00
		Depth to bedrock	0.00	Slope	0.82
		Low content of organic matter	0.12		
Rentsac-------------	30	Poor:		Poor:	
		Droughty	0.00	Depth to bedrock	0.00
		Depth to bedrock	0.00	Slope	0.08
		Low content of organic matter	0.12		
61:					
Rock outcrop--------	65	Not rated		Not rated	
Torriorthents-------	30	Poor:		Poor:	
		Droughty	0.00	Depth to bedrock	0.00
		Depth to bedrock	0.00	Slope	0.00
		Low content of organic matter	0.12		
62:					
Shawa---------------	85	Fair:		Good	
		Low content of organic matter	0.88		
		No water erosion limitation	0.99		
63:					
Silas---------------	85	Good		Good	

Table 12b.--Construction Materials--Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material: Rating class and limiting features	Value	Potential source of roadfill: Rating class and limiting features	Value
64:					
Torrifluvents	40	Fair:		Good	
		Low content of organic matter	0.12		
		No water erosion limitation	0.99		
Gullied land	40	Not rated		Not rated	
65:					
Torriorthents	50	Poor:		Poor:	
		Droughty	0.00	Depth to bedrock	0.00
		Depth to bedrock	0.00	Slope	0.00
		Low content of organic matter	0.12		
Rock outcrop	40	Not rated		Not rated	
66:					
Torriorthents	50	Poor:		Poor:	
		Droughty	0.00	Depth to bedrock	0.00
		Depth to bedrock	0.00	Slope	0.00
		Low content of organic matter	0.12		
Rock outcrop	40	Not rated		Not rated	
67:					
Tosca	80	Fair:		Poor:	
		Carbonate content	0.46	Slope	0.00
		Droughty	0.85		
		Low content of organic matter	0.88		
68:					
Trail	90	Poor:		Good	
		Wind erosion	0.00		
		Low content of organic matter	0.12		
		Too sandy	0.94		
		Droughty	0.99		
69:					
Travessilla	45	Poor:		Poor:	
		Droughty	0.00	Depth to bedrock	0.00
		Depth to bedrock	0.00	Slope	0.08
		Low content of organic matter	0.12		
Rock outcrop	40	Not rated		Not rated	
70:					
Uffens	85	Poor:		Good	
		Sodium content	0.00		
		Too alkaline	0.00		
		Low content of organic matter	0.12		
		Salinity	0.50		
		Carbonate content	0.80		
		Water erosion	0.90		

Table 12b.--Construction Materials--Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material: Rating class and limiting features	Value	Potential source of roadfill: Rating class and limiting features	Value
71:					
Utso	60	Fair:		Poor:	
		Droughty	0.79	Slope	0.00
		Low content of organic matter	0.88		
Rock outcrop	25	Not rated		Not rated	
72:					
Wesdy	70	Fair:		Fair:	
		Too clayey	0.12	Stone content	0.03
		Stone content	0.36	Cobble content	0.20
		Cobble content	0.66	Slope	0.92
		Low content of organic matter	0.88	Shrink-swell	0.92
73:					
Wesdy	45	Fair:		Poor:	
		Too clayey	0.12	Slope	0.00
		Stone content	0.36	Stone content	0.03
		Cobble content	0.66	Cobble content	0.20
		Low content of organic matter	0.88	Shrink-swell	0.92
Northwater	40	Fair:		Poor:	
		Stone content	0.93	Slope	0.00
74:					
Winnemucca	60	Fair:		Fair:	
		Too acid	0.99	Cobble content	0.86
Castino	30	Fair:		Poor:	
		Droughty	0.36	Depth to bedrock	0.00
		Depth to bedrock	0.58	Cobble content	0.61
				Shrink-swell	0.97
75:					
Wrayha	35	Fair:		Poor:	
		Low content of organic matter	0.12	Slope	0.00
		Too clayey	0.88	Shrink-swell	0.38
		No water erosion limitation	0.99		
Rabbitex	20	Fair:		Poor:	
		Carbonate content	0.80	Slope	0.00
		Low content of organic matter	0.88		
Veatch	20	Poor:		Poor:	
		Droughty	0.00	Slope	0.00
		Low content of organic matter	0.12	Depth to bedrock	0.00
		Depth to bedrock	0.58	Stone content	0.87
		Stone content	0.87		
		No water erosion limitation	0.99		

Table 12b.--Construction Materials--Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material: Rating class and limiting features	Value	Potential source of roadfill: Rating class and limiting features	Value
76:					
Wrayha	45	Fair:		Poor:	
		Low content of organic matter	0.12	Slope	0.00
		Too clayey	0.88	Shrink-swell	0.38
		No water erosion limitation	0.99		
Veatch	25	Poor:		Poor:	
		Droughty	0.00	Depth to bedrock	0.00
		Low content of organic matter	0.12	Slope	0.00
		Depth to bedrock	0.58	Stone content	0.87
		Stone content	0.87		
		No water erosion limitation	0.99		
Rabbitex	20	Fair:		Poor:	
		Carbonate content	0.80	Slope	0.00
		Low content of organic matter	0.88		
77:					
Yamo	55	Fair:		Good	
		Low content of organic matter	0.12		
Redcreek	35	Poor:		Poor:	
		Droughty	0.00	Depth to bedrock	0.00
		Depth to bedrock	0.00		
		Low content of organic matter	0.12		
78:					
Youngston	90	Fair:		Good	
		Low content of organic matter	0.88		
		Sodium content	0.97		
		No water erosion limitation	0.99		
79:					
Water	100	Not rated		Not rated	

Table 13.--Water Management

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. See text for definitions of terms used in this table. Absence of an entry indicates that no rating is applicable.)

Map symbol and soil name	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
1: Aga-------------------	Severe: seepage	Severe: seepage	Severe: cutbanks cave	Limitation: deep to water	Limitation: flooding soil blowing droughty	Limitation: too sandy soil blowing	Limitation: too arid droughty
2: Badland---------------	Severe: slope depth to rock	Severe: thin layer	Severe: no water	Limitation: deep to water	Limitation: slope depth to rock	Limitation: slope depth to rock	Limitation: slope depth to rock
3: Barx------------------	Severe: seepage	Severe: piping	Severe: no water	Limitation: deep to water	Limitation: slope	Limitation: erodes easily	Limitation: erodes easily too arid
4: Barx------------------	Severe: seepage	Severe: piping	Severe: no water	Limitation: deep to water	Limitation: slope	Limitation: erodes easily	Limitation: erodes easily too arid
Clapper---------------	Moderate: seepage slope	Moderate: large stones	Severe: no water	Limitation: deep to water	Limitation: large stones slope droughty	Limitation: large stones	Limitation: large stones too arid
5: Battlement------------	Severe: seepage	Severe: piping	Severe: no water	Limitation: deep to water	Limitation: slope	Limitation: erodes easily	Limitation: erodes easily too arid
6: Battlement------------	Moderate: seepage slope	Severe: piping	Severe: no water	Limitation: deep to water	Limitation: erodes easily excess salt slope	Limitation: erodes easily	Limitation: erodes easily too arid
7: Biedsaw---------------	Severe: slope	Slight	Severe: no water	Limitation: deep to water	Limitation: percs slowly slope	Limitation: erodes easily percs slowly slope	Limitation: erodes easily slope too arid

Table 13.--Water Management--Continued

Map symbol and soil name	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
7:							
Sunup	Severe: slope depth to rock	Severe: thin layer	Severe: no water	Limitation: deep to water	Limitation: slope depth to rock droughty	Limitation: large stones slope depth to rock	Limitation: large stones slope too arid
8:							
Billings	Moderate: slope	Moderate: piping	Severe: no water	Limitation: deep to water	Limitation: slope	Limitation: erodes easily	Limitation: erodes easily too arid
9:							
Bookcliff	Severe: slope	Severe: piping	Severe: no water	Limitation: deep to water	Limitation: slope	Limitation: slope	Limitation: slope
Utso	Severe: slope	Moderate: thin layer	Severe: no water	Limitation: deep to water	Limitation: slope droughty	Limitation: slope	Limitation: slope droughty
10:							
Borollic Calciorthids	Severe: slope	Severe: piping	Severe: no water	Limitation: deep to water	Limitation: erodes easily slope depth to rock	Limitation: erodes easily slope depth to rock	Limitation: erodes easily slope too arid
11:							
Borpark	Severe: slope	Severe: large stones	Severe: no water	Limitation: deep to water	Limitation: large stones slope droughty	Limitation: large stones slope	Limitation: large stones slope droughty
12:							
Bunkwater	Moderate: slope	Severe: excess sodium	Severe: no water	Limitation: deep to water	Limitation: excess sodium slope soil blowing	Limitation: soil blowing	Limitation: excess sodium too arid
13:							
Caballo	Severe: slope	Moderate: large stones thin layer	Severe: no water	Limitation: deep to water	Limitation: large stones slope droughty	Limitation: large stones slope	Limitation: large stones slope droughty

Table 13.--Water Management--Continued

Map symbol and soil name	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
14:							
Callings	Moderate: slope	Moderate: large stones	Severe: no water	Limitation: deep to water	Limitation: large stones slope droughty	Limitation: erodes easily large stones	Limitation: erodes easily large stones
15:							
Cameo	Severe: seepage	Severe: piping	Severe: no water	Limitation: deep to water	Limitation: slope soil blowing	Limitation: too sandy soil blowing	Limitation: too arid
16:							
Castino	Moderate: slope depth to rock	Severe: thin layer	Severe: no water	Limitation: deep to water	Limitation: large stones percs slowly slope	Limitation: large stones depth to rock	Limitation: large stones depth to rock
Skisams	Severe: depth to rock	Severe: piping	Severe: no water	Limitation: deep to water	Limitation: slope depth to rock	Limitation: depth to rock	Limitation: depth to rock
Winnemucca	Moderate: slope	Moderate: large stones	Severe: no water	Limitation: deep to water	Limitation: percs slowly slope	Limitation: large stones percs slowly	Limitation: large stones percs slowly
17:							
Cathedral	Severe: slope depth to rock	Severe: thin layer	Severe: no water	Limitation: deep to water	Limitation: slope depth to rock droughty	Limitation: large stones slope depth to rock	Limitation: large stones slope droughty
Veatch	Severe: seepage slope	Severe: thin layer	Severe: no water	Limitation: deep to water	Limitation: slope depth to rock droughty	Limitation: large stones slope depth to rock	Limitation: erodes easily large stones slope
18:							
Cerro	Moderate: slope	Severe: piping	Severe: no water	Limitation: deep to water	Limitation: percs slowly slope	Limitation: erodes easily percs slowly	Limitation: erodes easily percs slowly
19:							
Cerro	Severe: slope	Severe: piping	Severe: no water	Limitation: deep to water	Limitation: percs slowly slope	Limitation: erodes easily percs slowly slope	Limitation: erodes easily percs slowly slope

Table 13.--Water Management--Continued

Map symbol and soil name	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
20:							
Cerro	Severe: slope	Severe: piping	Severe: no water	Limitation: deep to water	Limitation: percs slowly slope	Limitation: erodes easily percs slowly slope	Limitation: erodes easily percs slowly slope
21:							
Chipeta	Severe: slope depth to rock	Severe: thin layer	Severe: no water	Limitation: deep to water	Limitation: percs slowly slope	Limitation: erodes easily slope depth to rock	Limitation: erodes easily slope too arid
22:							
Clapper	Severe: slope	Moderate: large stones	Severe: no water	Limitation: deep to water	Limitation: large stones slope droughty	Limitation: large stones slope	Limitation: large stones slope too arid
23:							
Clapper	Severe: slope	Moderate: large stones	Severe: no water	Limitation: deep to water	Limitation: large stones slope droughty	Limitation: large stones slope	Limitation: large stones slope too arid
24:							
Cochetopa	Severe: slope	Moderate: piping	Severe: no water	Limitation: deep to water	Limitation: percs slowly slope	Limitation: slope	Limitation: percs slowly slope
Clayburn	Severe: seepage slope	Moderate: piping thin layer	Severe: no water	Limitation: deep to water	Limitation: slope	Limitation: slope	Limitation: slope
25:							
Cowestglen	Severe: seepage	Severe: piping	Severe: no water	Limitation: deep to water	Limitation: slope soil blowing	Limitation: too sandy	Limitation: too arid
26:							
Cryochrepts	Severe: slope	Severe: large stones piping	Severe: no water	Limitation: deep to water	Limitation: large stones slope droughty	Limitation: large stones slope depth to rock	Limitation: large stones slope droughty

Table 13.--Water Management--Continued

Map symbol and soil name	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
26:							
Cryoborolls	Severe: slope	Moderate: large stones piping	Severe: no water	Limitation: deep to water	Limitation: large stones slope droughty	Limitation: large stones slope depth to rock	Limitation: large stones slope droughty
Rubble land	Severe: seepage slope	Severe: large stones seepage	Severe: no water	Limitation: deep to water	Limitation: large stones slope droughty	Limitation: large stones slope	Limitation: large stones slope droughty
27:							
Cryorthents	Severe: seepage slope depth to rock	Severe: thin layer	Severe: no water	Limitation: deep to water	Limitation: slope depth to rock droughty	Limitation: slope depth to rock	Limitation: slope depth to rock droughty
Rock outcrop	Severe: slope depth to rock	Severe: thin layer	Severe: no water	Limitation: deep to water	Limitation: slope depth to rock	Limitation: slope depth to rock	Limitation: slope depth to rock
28:							
Cumulic Haploborolls	Severe: seepage	Severe: seepage	Severe: slow refill cutbanks cave	Limitation: deep to water	Limitation: flooding droughty	Limitation: large stones too sandy	Limitation: large stones droughty
29:							
Debeque	Severe: seepage slope	Severe: seepage	Severe: no water	Limitation: deep to water	Limitation: slope droughty	Limitation: slope	Limitation: slope droughty
30:							
Debeque	Severe: seepage slope	Severe: seepage	Severe: no water	Limitation: deep to water	Limitation: slope droughty	Limitation: slope	Limitation: slope droughty
Hesperus	Severe: slope	Moderate: piping	Severe: no water	Limitation: deep to water	Limitation: slope	Limitation: slope	Limitation: slope
31:							
Dominguez	Slight	Slight	Severe: no water	Limitation: deep to water	Limitation: percs slowly	Limitation: percs slowly	Limitation: percs slowly too arid
32:							
Dominguez	Moderate: slope	Slight	Severe: no water	Limitation: deep to water	Limitation: percs slowly slope	Limitation: percs slowly	Limitation: percs slowly too arid

Table 13.--Water Management--Continued

Map symbol and soil name	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
33:							
Emmons	Severe: slope	Severe: piping	Severe: no water	Limitation: deep to water	Limitation: slope	Limitation: erodes easily slope	Limitation: erodes easily slope too arid
Cerro	Severe: slope	Severe: piping	Severe: no water	Limitation: deep to water	Limitation: percs slowly slope	Limitation: erodes easily percs slowly slope	Limitation: erodes easily percs slowly slope
Pagoda	Severe: slope	Moderate: piping	Severe: no water	Limitation: deep to water	Limitation: percs slowly slope	Limitation: percs slowly slope	Limitation: percs slowly slope
34:							
Empedrado	Severe: slope	Severe: piping	Severe: no water	Limitation: deep to water	Limitation: slope	Limitation: erodes easily slope	Limitation: erodes easily slope
35:							
Empedrado	Severe: slope	Severe: piping	Severe: no water	Limitation: deep to water	Limitation: slope	Limitation: erodes easily slope	Limitation: erodes easily slope
Pagoda	Severe: slope	Moderate: piping	Severe: no water	Limitation: deep to water	Limitation: percs slowly slope	Limitation: percs slowly slope	Limitation: percs slowly slope
Godding	Severe: slope	Moderate: large stones piping	Severe: no water	Limitation: deep to water	Limitation: large stones slope droughty	Limitation: large stones slope	Limitation: large stones slope droughty
36:							
Fluvaquents	Moderate: seepage	Severe: piping wetness	Severe: slow refill cutbanks cave	Limitation: flooding frost action cutbanks cave	Limitation: flooding wetness droughty	Limitation: too sandy wetness	Limitation: wetness droughty
37:							
Fughes	Moderate: slope	Severe: piping	Severe: no water	Limitation: deep to water	Limitation: slope	Favorable	Favorable
38:							
Fughes	Moderate: slope	Severe: piping	Severe: no water	Limitation: deep to water	Limitation: slope	Favorable	Favorable

Table 13.--Water Management--Continued

Map symbol and soil name	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
39:							
Fughes	Moderate: slope	Severe: piping	Severe: no water	Limitation: deep to water	Limitation: slope	Favorable	Favorable
Hesperus	Moderate: slope	Moderate: piping	Severe: no water	Limitation: deep to water	Limitation: slope	Favorable	Favorable
40:							
Godding	Severe: slope	Moderate: large stones piping	Severe: no water	Limitation: deep to water	Limitation: large stones slope droughty	Limitation: large stones slope	Limitation: large stones slope droughty
41:							
Golime	Severe: seepage slope	Severe: large stones	Severe: no water	Limitation: deep to water	Limitation: large stones slope droughty	Limitation: large stones slope	Limitation: large stones slope droughty
42:							
Grobutte	Severe: slope	Slight	Severe: no water	Limitation: deep to water	Limitation: slope droughty	Limitation: slope	Limitation: slope too arid droughty
43:							
Haploborolls	Severe: slope depth to rock	Severe: thin layer	Severe: no water	Limitation: deep to water	Limitation: large stones slope droughty	Limitation: large stones slope depth to rock	Limitation: large stones slope droughty
Rock outcrop	Severe: slope depth to rock	Severe: thin layer	Severe: no water	Limitation: deep to water	Limitation: slope depth to rock	Limitation: slope depth to rock	Limitation: slope depth to rock
44:							
Happle	Severe: seepage	Severe: seepage	Severe: no water	Limitation: deep to water	Limitation: slope droughty	Favorable	Limitation: too arid droughty
45:							
Happle	Severe: seepage slope	Severe: seepage	Severe: no water	Limitation: deep to water	Limitation: slope droughty	Limitation: slope	Limitation: slope too arid droughty

Table 13.--Water Management--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
46:							
Happle	Severe: seepage slope	Severe: seepage	Severe: no water	Limitation: deep to water	Limitation: slope droughty	Limitation: slope	Limitation: slope too arid droughty
Rock outcrop	Severe: slope depth to rock	Severe: thin layer	Severe: no water	Limitation: deep to water	Limitation: slope depth to rock	Limitation: slope depth to rock	Limitation: slope depth to rock
47:							
Hesperus	Severe: slope	Moderate: piping	Severe: no water	Limitation: deep to water	Limitation: slope	Limitation: slope	Limitation: slope
Empedrado	Severe: slope	Severe: piping	Severe: no water	Limitation: deep to water	Limitation: slope	Limitation: erodes easily slope	Limitation: erodes easily slope
Pagoda	Severe: slope	Moderate: piping	Severe: no water	Limitation: deep to water	Limitation: percs slowly slope	Limitation: percs slowly slope	Limitation: percs slowly slope
48:							
Hesperus	Severe: slope	Moderate: piping	Severe: no water	Limitation: deep to water	Limitation: slope	Limitation: slope	Limitation: slope
Empedrado	Severe: slope	Severe: piping	Severe: no water	Limitation: deep to water	Limitation: slope	Limitation: erodes easily slope	Limitation: erodes easily slope
Pagoda	Severe: slope	Moderate: piping	Severe: no water	Limitation: deep to water	Limitation: percs slowly slope	Limitation: percs slowly slope	Limitation: percs slowly slope
49:							
Hesperus	Moderate: slope	Moderate: piping	Severe: no water	Limitation: deep to water	Limitation: slope	Favorable	Favorable
Pagoda	Moderate: slope	Moderate: piping	Severe: no water	Limitation: deep to water	Limitation: percs slowly slope	Limitation: percs slowly	Limitation: percs slowly

Table 13.--Water Management--Continued

Map symbol and soil name	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
50:							
Irigul	Severe: slope depth to rock	Severe: thin layer	Severe: no water	Limitation: deep to water	Limitation: slope depth to rock droughty	Limitation: slope depth to rock	Limitation: slope depth to rock droughty
Starman	Severe: slope depth to rock	Severe: thin layer	Severe: no water	Limitation: deep to water	Limitation: large stones slope droughty	Limitation: large stones slope depth to rock	Limitation: large stones slope droughty
51:							
Mesa	Moderate: seepage slope	Slight	Severe: no water	Limitation: deep to water	Limitation: percs slowly slope soil blowing	Limitation: soil blowing	Limitation: percs slowly too arid
Avalon	Severe: seepage	Severe: piping	Severe: no water	Limitation: deep to water	Limitation: erodes easily slope	Limitation: erodes easily	Limitation: erodes easily too arid
52:							
Northwater	Severe: seepage slope	Slight	Severe: no water	Limitation: deep to water	Limitation: slope	Limitation: slope	Limitation: slope
Adel	Severe: slope	Moderate: piping	Severe: no water	Limitation: deep to water	Limitation: slope	Limitation: slope	Limitation: slope
53:							
Pagoda	Severe: slope	Moderate: piping	Severe: no water	Limitation: deep to water	Limitation: percs slowly slope	Limitation: percs slowly slope	Limitation: percs slowly slope
Hesperus	Severe: slope	Moderate: piping	Severe: no water	Limitation: deep to water	Limitation: slope	Limitation: slope	Limitation: slope
54:							
Panitchen	Severe: seepage	Severe: piping	Severe: no water	Limitation: deep to water	Limitation: erodes easily slope	Limitation: erodes easily	Limitation: erodes easily too arid

Table 13.--Water Management--Continued

Map symbol and soil name	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
55:							
Parachute	Severe: slope	Severe: thin layer	Severe: no water	Limitation: deep to water	Limitation: slope depth to rock droughty	Limitation: slope depth to rock	Limitation: slope depth to rock droughty
Irigul	Severe: slope depth to rock	Severe: thin layer	Severe: no water	Limitation: deep to water	Limitation: slope depth to rock droughty	Limitation: slope depth to rock	Limitation: slope depth to rock droughty
56:							
Parachute	Severe: slope	Severe: thin layer	Severe: no water	Limitation: deep to water	Limitation: slope depth to rock droughty	Limitation: slope depth to rock	Limitation: slope depth to rock droughty
Irigul	Severe: slope depth to rock	Severe: thin layer	Severe: no water	Limitation: deep to water	Limitation: slope depth to rock droughty	Limitation: slope depth to rock	Limitation: slope depth to rock droughty
Rhone	Severe: slope	Moderate: thin layer	Severe: no water	Limitation: deep to water	Limitation: slope	Limitation: slope	Limitation: slope
57:							
Parachute	Severe: slope	Severe: thin layer	Severe: no water	Limitation: deep to water	Limitation: slope depth to rock droughty	Limitation: slope depth to rock	Limitation: slope depth to rock droughty
Rhone	Severe: slope	Moderate: thin layer	Severe: no water	Limitation: deep to water	Limitation: slope	Limitation: slope	Limitation: slope
58:							
Peninsula	Moderate: seepage slope	Severe: piping	Severe: no water	Limitation: deep to water	Limitation: percs slowly slope	Limitation: erodes easily	Limitation: erodes easily percs slowly
59:							
Persayo	Severe: slope depth to rock	Severe: piping	Severe: no water	Limitation: deep to water	Limitation: excess salt slope depth to rock	Limitation: erodes easily slope depth to rock	Limitation: excess salt slope too arid

Table 13.--Water Management--Continued

Map symbol and soil name	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
60:							
Redcreek	Severe: slope depth to rock	Severe: thin layer	Severe: no water	Limitation: deep to water	Limitation: slope soil blowing droughty	Limitation: slope soil blowing depth to rock	Limitation: slope too arid droughty
Rentsac	Severe: slope depth to rock	Severe: thin layer	Severe: no water	Limitation: deep to water	Limitation: slope depth to rock droughty	Limitation: slope depth to rock	Limitation: slope too arid droughty
61:							
Rock outcrop	Severe: slope depth to rock	Severe: thin layer	Severe: no water	Limitation: deep to water	Limitation: slope depth to rock	Limitation: slope depth to rock	Limitation: slope depth to rock
Torriorthents	Severe: slope depth to rock	Severe: thin layer	Severe: no water	Limitation: deep to water	Limitation: slope droughty	Limitation: large stones slope depth to rock	Limitation: large stones slope too arid
62:							
Shawa	Severe: slope	Severe: piping	Severe: no water	Limitation: deep to water	Limitation: slope	Limitation: erodes easily slope	Limitation: erodes easily slope
63:							
Silas	Moderate: slope	Moderate: piping wetness	Severe: slow refill	Limitation: deep to water	Limitation: slope	Favorable	Favorable
64:							
Torrifluvents	Severe: seepage	Severe: piping	Severe: no water	Limitation: deep to water	Limitation: erodes easily flooding	Limitation: erodes easily	Limitation: erodes easily too arid
Gullied land.							
65:							
Torriorthents	Severe: slope depth to rock	Severe: thin layer	Severe: no water	Limitation: deep to water	Limitation: slope droughty	Limitation: large stones slope depth to rock	Limitation: large stones slope too arid
Rock outcrop	Severe: slope depth to rock	Severe: thin layer	Severe: no water	Limitation: deep to water	Limitation: slope depth to rock	Limitation: slope depth to rock	Limitation: slope depth to rock

Table 13.--Water Management--Continued

Map symbol and soil name	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
66:							
Torriorthents	Severe: slope depth to rock	Severe: thin layer	Severe: no water	Limitation: deep to water	Limitation: slope droughty	Limitation: large stones slope depth to rock	Limitation: large stones slope too arid
Rock outcrop	Severe: slope depth to rock	Severe: thin layer	Severe: no water	Limitation: deep to water	Limitation: slope depth to rock	Limitation: slope depth to rock	Limitation: slope depth to rock
67:							
Tosca	Severe: seepage slope	Severe: seepage	Severe: no water	Limitation: deep to water	Limitation: slope droughty	Limitation: slope	Limitation: slope droughty
68:							
Trail	Severe: seepage	Severe: seepage piping	Severe: no water	Limitation: deep to water	Limitation: fast intake slope droughty	Limitation: too sandy soil blowing	Limitation: too arid droughty
69:							
Travessilla	Severe: slope depth to rock	Severe: thin layer	Severe: no water	Limitation: deep to water	Limitation: slope soil blowing depth to rock	Limitation: slope soil blowing depth to rock	Limitation: slope too arid depth to rock
Rock outcrop	Severe: slope depth to rock	Severe: thin layer	Severe: no water	Limitation: deep to water	Limitation: slope depth to rock	Limitation: slope depth to rock	Limitation: slope depth to rock
70:							
Uffens	Moderate: seepage slope	Severe: excess sodium piping	Severe: no water	Limitation: deep to water	Limitation: erodes easily excess sodium slope	Limitation: erodes easily	Limitation: erodes easily excess sodium too arid
71:							
Utso	Severe: slope	Slight	Severe: no water	Limitation: deep to water	Limitation: slope droughty	Limitation: slope	Limitation: slope droughty
Rock outcrop	Severe: slope depth to rock	Severe: thin layer	Severe: no water	Limitation: deep to water	Limitation: slope depth to rock	Limitation: slope depth to rock	Limitation: slope depth to rock

Table 13.--Water Management--Continued

Map symbol and soil name	Limitations for-- Pond reservoir areas	Limitations for-- Embankments, dikes, and levees	Limitations for-- Aquifer-fed excavated ponds	Features affecting-- Drainage	Features affecting-- Irrigation	Features affecting-- Terraces and diversions	Features affecting-- Grassed waterways
72:							
Wesdy	Severe: slope	Severe: large stones	Severe: no water	Limitation: deep to water	Limitation: large stones slope droughty	Limitation: large stones percs slowly slope	Limitation: large stones slope droughty
73:							
Wesdy	Severe: slope	Severe: large stones	Severe: no water	Limitation: deep to water	Limitation: large stones slope droughty	Limitation: large stones percs slowly slope	Limitation: large stones slope droughty
Northwater	Severe: seepage slope	Slight	Severe: no water	Limitation: deep to water	Limitation: slope	Limitation: slope	Limitation: slope
74:							
Winnemucca	Moderate: slope	Moderate: large stones	Severe: no water	Limitation: deep to water	Limitation: percs slowly slope	Limitation: large stones percs slowly	Limitation: large stones percs slowly
Castino	Moderate: slope depth to rock	Severe: thin layer	Severe: no water	Limitation: deep to water	Limitation: large stones percs slowly slope	Limitation: large stones depth to rock	Limitation: large stones depth to rock
75:							
Wrayha	Severe: slope	Slight	Severe: no water	Limitation: deep to water	Limitation: percs slowly slope soil blowing	Limitation: erodes easily slope soil blowing	Limitation: erodes easily slope too arid
Rabbitex	Severe: slope	Severe: piping	Severe: no water	Limitation: deep to water	Limitation: slope	Limitation: slope	Limitation: slope
Veatch	Severe: seepage slope	Severe: thin layer	Severe: no water	Limitation: deep to water	Limitation: slope depth to rock droughty	Limitation: large stones slope depth to rock	Limitation: erodes easily large stones slope
76:							
Wrayha	Severe: slope	Slight	Severe: no water	Limitation: deep to water	Limitation: percs slowly slope soil blowing	Limitation: erodes easily slope soil blowing	Limitation: erodes easily slope too arid

Table 13.--Water Management--Continued

Map symbol and soil name	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
76:							
Veatch	Severe: seepage slope	Severe: thin layer	Severe: no water	Limitation: deep to water	Limitation: slope depth to rock droughty	Limitation: large stones slope depth to rock	Limitation: erodes easily large stones slope
Rabbitex	Severe: slope	Severe: piping	Severe: no water	Limitation: deep to water	Limitation: slope	Limitation: slope	Limitation: slope
77:							
Yamo	Severe: seepage slope	Severe: piping	Severe: no water	Limitation: deep to water	Limitation: slope	Limitation: slope	Limitation: slope too arid
Redcreek	Severe: slope depth to rock	Severe: thin layer	Severe: no water	Limitation: deep to water	Limitation: slope soil blowing droughty	Limitation: slope soil blowing depth to rock	Limitation: slope too arid droughty
78:							
Youngston	Moderate: seepage slope	Severe: piping	Severe: no water	Limitation: deep to water	Limitation: erodes easily excess salt slope	Limitation: erodes easily	Limitation: erodes easily too arid
79:							
Water.							

Soil Properties

Data relating to soil properties are collected during the course of the soil survey.

Soil properties are ascertained by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine particle-size distribution, plasticity, and compaction characteristics.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help to characterize key soils.

The estimates of soil properties are shown in tables. They include engineering index properties, physical and chemical properties, and pertinent soil and water features.

Engineering Index Properties

Table 14 gives the engineering classifications and the range of index properties for the layers of each soil in the survey area.

Depth to the upper and lower boundaries of each layer is indicated.

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is 15 percent or more, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system (ASTM, 1998) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO, 1998).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to particle-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of particle-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

Rock fragments larger than 10 inches in diameter and 3 to 10 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of particle-size distribution, liquid limit, and plasticity index are generally rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2

percentage points) across classification boundaries, the classification in the marginal zone is generally omitted in the table.

Physical Properties

Table 15 shows estimates of some physical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In the table, the estimated clay content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay affect the fertility and physical condition of the soil and the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at $^1/_3$- or $^1/_{10}$-bar (33kPa or 10kPa) moisture tension. Weight is determined after the soil is dried at 105 degrees C. In the table, the estimated moist bulk density of each soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. Depending on soil texture, a bulk density of more than 1.4 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability (K_{sat}) refers to the ability of a soil to transmit water or air. The term "permeability," as used in soil surveys, indicates saturated hydraulic conductivity (K_{sat}). The estimates in the table indicate the rate of water movement, in inches per hour, when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems and septic tank absorption fields.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each soil layer. The capacity varies, depending on soil properties that affect retention of water. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Linear extensibility refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. It is an expression of the volume change between the water content of the clod at $^1/_3$- or $^1/_{10}$-bar tension (33kPa or 10kPa tension) and oven dryness. The volume change is reported in the table as percent change for the whole soil. Volume change is influenced by the amount and type of clay minerals in the soil.

Linear extensibility is used to determine the shrink-swell potential of soils. The shrink-swell potential is low if the soil has a linear extensibility of less than 3 percent; moderate if 3 to 6 percent; high if 6 to 9 percent; and very high if more than 9 percent. If the linear extensibility is more than 3, shrinking and swelling can cause damage to buildings, roads, and other structures and to plant roots. Special design commonly is needed.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In the table, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter in a soil can be maintained by returning crop residue to the soil. Organic matter has a positive effect on available water capacity, water infiltration, soil organism activity, and tilth. It is a source of nitrogen and other nutrients for crops and soil organisms.

Erosion factors are shown in the table as the K factor (Kw and Kf) and the T factor. Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of several factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The

estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and permeability. Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor Kw indicates the erodibility of the whole soil. The estimates are modified by the presence of rock fragments.

Erosion factor Kf indicates the erodibility of the fine-earth fraction, or the material less than 2 millimeters in size.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Wind erodibility groups are made up of soils that have similar properties affecting their susceptibility to wind erosion in cultivated areas. The soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible. The groups are as follows:

1. Coarse sands, sands, fine sands, and very fine sands.

2. Loamy coarse sands, loamy sands, loamy fine sands, loamy very fine sands, ash material, and sapric soil material.

3. Coarse sandy loams, sandy loams, fine sandy loams, and very fine sandy loams.

4L. Calcareous loams, silt loams, clay loams, and silty clay loams.

4. Clays, silty clays, noncalcareous clay loams, and silty clay loams that are more than 35 percent clay.

5. Noncalcareous loams and silt loams that are less than 20 percent clay and sandy clay loams, sandy clays, and hemic soil material.

6. Noncalcareous loams and silt loams that are more than 20 percent clay and noncalcareous clay loams that are less than 35 percent clay.

7. Silts, noncalcareous silty clay loams that are less than 35 percent clay, and fibric soil material.

8. Soils that are not subject to wind erosion because of coarse fragments on the surface or because of surface wetness.

Wind erodibility index is a numerical value indicating the susceptibility of soil to wind erosion, or the tons per acre per year that can be expected to be lost to wind erosion. There is a close correlation between wind erosion and the texture of the surface layer, the size and durability of surface clods, rock fragments, organic matter, and a calcareous reaction. Soil moisture and frozen soil layers also influence wind erosion.

Chemical Properties

Table 16 shows estimates of some chemical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated.

Cation-exchange capacity is the total amount of extractable bases that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. Soils having a low cation-exchange capacity hold fewer cations and may require more frequent applications of fertilizer than soils having a high cation-exchange capacity. The ability to retain cations reduces the hazard of ground-water pollution.

Soil reaction is a measure of acidity or alkalinity. The pH of each soil horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Calcium carbonate equivalent is the percent of carbonates, by weight, in the fraction of the soil less than 2 millimeters in size. The availability of plant nutrients is influenced by the amount of carbonates in the soil. Incorporating nitrogen fertilizer into calcareous soils helps to prevent nitrite accumulation and ammonium-N volatilization.

Gypsum is expressed as a percent, by weight, of hydrated calcium sulfates in the fraction of the soil less than 20 millimeters in size. Gypsum is partially soluble in water. Soils that have a high content of gypsum may collapse if the gypsum is removed by percolating water.

Salinity is a measure of soluble salts in the soil at saturation. It is expressed as the electrical conductivity of the saturation extract, in millimhos per centimeter at 25 degrees C. Estimates are based on field and laboratory measurements at representative sites of nonirrigated soils. The salinity of irrigated soils is affected by the quality of the irrigation water and by the frequency of water application. Hence, the salinity of soils in individual fields can differ greatly from the value given in the table. Salinity affects the suitability of a soil for crop production, the stability of soil if used

as construction material, and the potential of the soil to corrode metal and concrete.

Sodium adsorption ratio (SAR) is a measure of the amount of sodium (Na) relative to calcium (Ca) and magnesium (Mg) in the water extract from saturated soil paste. It is the ratio of the Na concentration divided by the square root of one-half of the Ca + Mg concentration. Soils that have SAR values of 13 or more may be characterized by an increased dispersion of organic matter and clay particles, reduced permeability and aeration, and a general degradation of soil structure.

Water Features

Table 17 gives estimates of various water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas.

The *months* in the table indicate the portion of the year in which the feature is most likely to be a concern.

Water table refers to a saturated zone in the soil. Table 17 indicates, by month, depth to the top (*upper limit*) and base (*lower limit*) of the saturated zone in most years. Estimates of the upper and lower limits are based mainly on observations of the water table at selected sites and on evidence of a saturated zone, namely grayish colors or mottles (redoximorphic features) in the soil. A saturated zone that lasts for less than a month is not considered a water table.

Flooding is the temporary inundation of an area caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt is not considered flooding, and water standing in swamps and marshes is considered ponding rather than flooding.

Duration and *frequency* are estimated. Duration is expressed as *extremely brief* if 0.1 hour to 4 hours, *very brief* if 4 hours to 2 days, *brief* if 2 to 7 days, *long* if 7 to 30 days, and *very long* if more than 30 days. Frequency is expressed as none, very rare, rare, occasional, frequent, and very frequent. *None* means that flooding is not probable; *very rare* that it is very unlikely but possible under extremely unusual weather conditions (the chance of flooding is less than 1 percent in any year); *rare* that it is unlikely but possible under unusual weather conditions (the chance of flooding is 1 to 5 percent in any year); *occasional* that it occurs infrequently under normal weather conditions (the chance of flooding is 5 to 50 percent in any year); *frequent* that it is likely to occur often under normal weather conditions (the chance of flooding is more than 50 percent in any year but is less than 50 percent in all months in any year); and *very frequent* that it is likely to occur very often under normal weather conditions (the chance of flooding is more than 50 percent in all months of any year).

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and little or no horizon development.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

Soil Features

Table 18 gives estimates of various soil features. The estimates are used in land use planning that involves engineering considerations.

A *restrictive layer* is a nearly continuous layer that has one or more physical, chemical, or thermal properties that significantly impede the movement of water and air through the soil or that restrict roots or otherwise provide an unfavorable root environment. Examples are bedrock, cemented layers, dense layers, and frozen layers. *Depth to top* is the vertical distance from the soil surface to the upper boundary of the restrictive layer.

Potential for frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, permeability, content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained. Silty and highly structured, clayey soils that have a high water table in winter are the most susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage to pavements and other rigid structures.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that corrodes or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The steel or concrete in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than the steel or concrete in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low, moderate,* or *high,* is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion also is expressed as *low, moderate,* or *high*. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Table 14.--Engineering Index Properties

(Absence of an entry indicates that the data were not estimated.)

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
1:												
Aga	0-3	Very fine sandy loam	ML	A-4	0	0	100	100	85-95	50-65	25-30	NP-5
	3-28	Stratified loamy sand to very fine sandy loam	SC-SM, SM	A-4	0	0	85-100	80-100	60-85	35-50	20-25	NP-5
	28-60	Extremely gravelly sand	GW-GM, GW	A-1	0	15-30	15-30	10-25	5-15	0-5	---	NP
2:												
Badland	0-60	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
3:												
Barx	0-3	Loam	CL, CL-ML	A-4	0	0	100	100	85-95	60-75	25-30	5-10
	3-14	Clay loam	CL	A-6	0	0	100	100	90-100	70-80	30-40	10-20
	14-40	Loam	CL, CL-ML	A-4	0	0	100	100	85-95	60-75	25-30	5-10
	40-60	Loam	CL, CL-ML	A-4	0	0	100	100	85-95	60-75	25-30	5-10
4:												
Barx	0-3	Loam	CL, CL-ML	A-4	0	0	100	100	85-95	60-75	25-30	5-10
	3-14	Clay loam	CL	A-6	0	0	100	100	90-100	70-80	30-40	10-20
	14-40	Loam	CL, CL-ML	A-4	0	0	100	100	85-95	60-75	25-30	5-10
	40-60	Loam	CL, CL-ML	A-4	0	0	100	100	85-95	60-75	25-30	5-10
Clapper	0-3	Very stony loam	CL-ML, CL, SC, SC-SM	A-4	25-30	15-25	75-90	70-85	60-80	45-65	25-30	5-10
	3-12	Very stony loam	CL-ML, CL, SC, SC-SM	A-4	15-20	25-30	75-90	70-85	60-80	45-65	25-30	5-10
	12-26	Very cobbly loam	SC, SC-SM	A-4	0-5	25-40	75-85	70-80	60-70	40-50	25-30	5-10
	26-60	Extremely cobbly loam, very cobbly loam	GC, GC-GM	A-1, A-4, A-2	0-10	30-55	40-70	30-65	25-60	20-50	25-30	5-10

Table 14.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
5:												
Battlement------	0-6	Loam	CL, CL-ML	A-4	0	0	90-100	80-100	75-90	55-70	25-30	5-10
	6-45	Stratified sandy loam to silty clay loam	CL, CL-ML	A-4, A-6	0	0	90-100	80-100	70-85	50-75	25-35	5-15
	45-60	Stratified sandy loam to loam	CL-ML, CL, SC, SC-SM	A-4	0	0	90-100	80-100	60-85	40-65	25-30	5-10
6:												
Battlement------	0-6	Loam	CL, CL-ML	A-4	0	0	90-100	85-100	70-85	55-65	25-30	5-10
	6-15	Fine sandy loam	SC, SC-SM	A-4	0	0	90-100	85-100	75-90	35-45	25-30	5-10
	15-60	Stratified sandy loam to silty clay loam	CL, CL-ML	A-4, A-6	0	0	90-100	85-100	70-85	50-70	25-35	5-15
7:												
Biedsaw---------	0-4	Gravelly loam	CL-ML, GC-GM, SC-SM	A-4	0	0-5	60-80	55-75	45-65	40-65	25-30	5-10
	4-9	Loam	CL, CL-ML	A-4	0	0-5	95-100	85-100	75-95	55-75	25-30	5-10
	9-43	Clay, clay loam, silty clay loam	CL	A-6, A-7	0	0	95-100	90-100	80-100	70-90	30-45	10-20
	43-60	Silty clay loam, clay	CL	A-6, A-7	0	0	95-100	90-100	85-100	70-90	35-45	15-20
Sunup-----------	0-4	Gravelly loam	GC-GM, GC, SC, SC-SM	A-4	0-10	0-10	65-80	60-75	50-70	35-50	25-30	5-10
	4-11	Extremely gravelly loam, very gravelly loam	GC, GC-GM	A-2, A-1, A-4	5-15	10-20	25-55	20-50	15-50	10-40	25-30	5-10
	11-15	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
8:												
Billings--------	0-7	Silty clay loam	ML	A-4, A-6, A-7	0	0	100	100	95-100	90-95	30-45	5-15
	7-43	Silty clay loam, clay loam	CL	A-6	0	0	100	100	95-100	70-95	30-35	10-15
	43-60	Fine sandy loam	SC-SM, SM	A-4	0	0	100	100	70-85	40-50	20-25	NP-5

Table 14.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
9:												
Bookcliff-------	0-2	Loam	CL, CL-ML	A-4	0	0	95-100	90-100	75-95	55-75	25-30	5-10
	2-18	Clay loam, loam	CL, CL-ML	A-4	0	0	95-100	90-100	75-95	55-75	25-30	5-10
	18-36	Gravelly loam	CL-ML, CL, SC, SC-SM	A-4	0	5-15	75-85	70-80	60-75	45-60	25-30	5-10
	36-42	Cobbly loam	CL-ML, CL, SC, SC-SM	A-4	0	5-15	75-85	70-80	60-75	45-60	25-30	5-10
	42-60	Very cobbly loam	CL, SC-SM, CL-ML, SC	A-4	0	35-45	75-85	70-80	60-75	45-60	25-30	5-10
Utso------------	0-4	Channery loam	GC, GC-GM, SC-SM, SC	A-4	0	0	60-80	55-75	50-70	40-50	25-30	5-10
	4-11	Very channery loam	GC, GC-GM	A-2, A-4	0	0-5	35-50	30-50	25-45	20-40	25-30	5-10
	11-44	Very channery loam	GC, GC-GM	A-2, A-4	0	0-5	35-50	30-50	25-45	20-40	25-30	5-10
	44-48	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
10:												
Borollic Calciorthids---	0-4	Loam	CL, CL-ML	A-4	0	0-5	90-100	85-95	75-85	55-75	25-30	5-10
	4-11	Clay loam, silty clay loam	CL	A-6	0	0-5	90-100	85-95	80-90	65-85	30-35	10-15
	11-60	Extremely gravelly sandy loam, very gravelly loam, silt loam, loam, silty clay loam	CL-ML, ML, GC, CL, GM	A-4, A-1, A-2	0	0-5	30-100	20-100	20-90	10-75	20-30	NP-10
11:												
Borpark---------	0-2	Stony loam	CL-ML, CL, SC, SC-SM	A-4	15-30	15-35	85-95	80-90	60-75	40-70	25-30	5-10
	2-8	Cobbly clay loam	CL	A-6	0-10	15-45	75-90	70-85	65-85	50-70	30-40	10-20
	8-41	Very cobbly clay loam	CL, SC	A-6	10-25	20-35	75-80	70-75	65-75	40-60	30-40	10-20
	41-60	Extremely cobbly silty clay loam, extremely cobbly silt loam	GM, GP-GM	A-1, A-2, A-4	0-30	30-85	20-80	15-75	15-75	10-70	30-35	5-10
	60-66	Extremely stony sandy loam	SC, SC-SM	A-1, A-2	30-45	50-70	75-80	70-75	40-55	15-35	25-30	5-10

Table 14.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments >10 inches	Fragments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
12: Bunkwater	0-2	Very fine sandy loam	CL, CL-ML	A-4	0	0	90-100	85-100	70-95	50-65	25-30	5-10
	2-13	Sandy clay loam, clay loam	CL	A-6	0	0	90-100	85-100	70-95	55-85	30-35	10-15
	13-33	Sandy clay loam, clay loam	CL	A-6	0	0	90-100	85-100	70-95	55-85	30-35	10-15
	33-60	Clay loam, silty clay loam	CL	A-6	0	0	90-100	85-100	70-95	55-85	30-35	10-15
13: Caballo	0-6	Very channery loam	GC, GC-GM	A-2, A-4	0	10-15	35-60	35-55	30-45	25-40	25-30	5-10
	6-18	Very channery loam	GC, GC-GM	A-2, A-4	0-10	10-25	35-60	35-50	30-45	25-40	25-30	5-10
	18-44	Extremely channery loam	GC, GC-GM	A-1, A-2	10-25	25-40	30-40	25-35	20-30	15-20	25-30	5-10
	44-48	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
14: Callings	0-11	Loam	CL, CL-ML	A-4	0	0	80-95	75-90	65-85	50-70	25-30	5-10
	11-15	Loam	CL, CL-ML	A-4	0	0	80-95	75-90	65-85	50-70	25-30	5-10
	15-46	Very cobbly clay loam, very cobbly clay	CL	A-7	0-5	45-55	75-90	75-80	70-80	50-75	40-50	20-25
	46-60	Very cobbly clay	CL	A-7	0-5	45-55	75-90	75-80	70-80	50-75	40-50	20-25
15: Cameo	0-4	Fine sandy loam	SC-SM, SM	A-4	0	0	100	100	70-85	40-50	20-25	NP-5
	4-60	Stratified loamy sand to loam	SC-SM, SM	A-2, A-1, A-4	0	0	80-100	75-100	45-75	20-50	20-25	NP-5

Table 14.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments >10 inches	Fragments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct	Pct					Pct	
16:												
Castino---------	0-16	Loam	CL, CL-ML	A-4	0	0-5	100	100	85-95	60-75	25-30	5-10
	16-21	Cobbly clay loam	CL	A-6	0	15-30	95-100	90-100	80-100	65-80	30-40	10-20
	21-29	Very cobbly clay loam	CL	A-6	0-5	40-50	80-90	75-85	70-80	55-65	30-40	10-20
	29-38	Very cobbly clay	CL	A-7	0-5	40-50	80-90	75-85	70-80	60-80	40-50	20-25
	38-42	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
Skisams---------	0-15	Loam	CL, CL-ML	A-4	0	0-5	95-100	85-100	70-95	50-75	25-30	5-10
	15-19	Loam, gravelly loam	CL, CL-ML, SC-SM, SC	A-4	0	0-5	90-100	75-100	65-95	45-75	25-30	5-10
	19-23	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
Winnemucca------	0-19	Loam	CL, CL-ML	A-4	0	0-5	100	100	85-95	60-75	25-30	5-10
	19-28	Cobbly clay loam	CL	A-6	0	20-30	85-95	80-90	75-90	55-70	30-35	10-15
	28-36	Very cobbly clay loam	CL	A-6	0-5	40-50	80-90	75-85	70-80	60-80	30-40	10-15
	36-50	Very cobbly clay	CL	A-7	0-5	40-50	80-90	75-85	70-80	55-65	40-50	20-25
	50-60	Clay	CL	A-7	0	5-15	95-100	90-95	80-95	65-90	40-50	20-25
17:												
Cathedral-------	0-5	Very stony sandy loam	GM, GC-GM, SC-SM, SM	A-1, A-2	25-50	10-20	45-90	40-85	25-50	15-30	20-25	NP-5
	5-11	Extremely gravelly sandy loam, very gravelly sandy loam	GC, GC-GM, GW-GC	A-1, A-2	0-5	5-25	35-55	20-50	10-35	5-20	25-30	5-10
	11-15	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
Veatch----------	0-6	Loam	CL, CL-ML	A-4	0	0	100	100	85-95	60-75	25-30	5-10
	6-11	Loam	CL, CL-ML	A-4	0	0	100	100	85-95	60-75	25-30	5-10
	11-32	Very channery sandy loam	GC, GW-GC, GC-GM	A-1, A-2	0-25	0-30	35-55	30-50	20-35	10-20	25-30	5-10
	32-36	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---

Table 14.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
18:												
Cerro-----------	0-7	Silty clay loam	ML	A-4, A-6, A-7	0	0	100	100	95-100	85-95	30-45	5-15
	7-12	Silty clay loam	ML	A-4, A-7, A-6	0	0	100	100	95-100	85-95	30-50	5-20
	12-35	Silty clay	MH, ML	A-7	0	0	100	100	95-100	90-95	45-70	15-35
	35-60	Silty clay loam	ML	A-4, A-7	0	0	100	100	95-100	85-95	30-50	5-15
19:												
Cerro-----------	0-7	Silty clay loam	ML	A-4, A-6, A-7	0	0	100	100	95-100	85-95	30-45	5-15
	7-12	Silty clay loam	ML	A-4, A-7, A-6	0	0	100	100	95-100	85-95	30-50	5-20
	12-35	Silty clay	MH, ML	A-7	0	0	100	100	95-100	90-95	45-70	15-35
	35-60	Silty clay loam	ML	A-4, A-7	0	0	100	100	95-100	85-95	30-50	5-15
20:												
Cerro-----------	0-7	Silty clay loam	ML	A-4, A-6, A-7	0	0	100	100	95-100	85-95	30-45	5-15
	7-12	Silty clay loam	ML	A-4, A-7, A-6	0	0	100	100	95-100	85-95	30-50	5-20
	12-35	Silty clay	MH, ML	A-7	0	0	100	100	95-100	90-95	45-70	15-35
	35-60	Silty clay loam	ML	A-4, A-7	0	0	100	100	95-100	85-95	30-50	5-15
21:												
Chipeta---------	0-4	Silty clay loam	ML	A-4, A-7	0	0	100	100	90-95	80-90	30-50	5-15
	4-13	Silty clay loam, silty clay	ML	A-7	0	0	100	100	95-100	90-95	45-50	15-20
	13-17	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
22:												
Clapper---------	0-3	Very stony loam	CL-ML, CL, SC, SC-SM	A-4	25-30	15-25	75-90	70-85	60-80	45-65	25-30	5-10
	3-12	Very stony loam	CL, CL-ML, SC-SM, SC	A-4	15-20	25-30	75-90	70-85	60-80	45-65	25-30	5-10
	12-26	Very cobbly loam	SC, SC-SM	A-4	0-5	25-40	75-85	70-80	60-70	40-50	25-30	5-10
	26-60	Extremely cobbly loam, very cobbly loam	GC, GC-GM	A-4, A-1, A-2	0-10	30-55	40-70	25-65	20-60	15-50	25-30	5-10

Table 14.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
23:												
Clapper---------	0-3	Very stony loam	CL-ML, CL, SC, SC-SM	A-4	25-30	15-25	75-90	70-85	60-80	45-65	25-30	5-10
	3-12	Very stony loam	CL, CL-ML, SC-SM, SC	A-4	15-20	25-30	75-90	70-85	60-80	45-65	25-30	5-10
	12-26	Very cobbly loam	SC, SC-SM	A-4	0-5	25-40	75-85	70-80	60-70	40-50	25-30	5-10
	26-60	Extremely cobbly loam, very cobbly loam	GC, GC-GM	A-4, A-1, A-2	0-10	30-55	40-70	25-65	20-60	15-50	25-30	5-10
24:												
Cochetopa-------	0-20	Clay loam	CL	A-6	0	0-5	90-100	85-100	75-100	60-80	30-40	10-20
	20-33	Clay loam	CL	A-6, A-7	0	0-5	90-100	85-100	75-100	60-80	30-45	10-20
	33-45	Clay	CL	A-7	0	0-5	90-100	85-100	75-100	65-95	40-50	20-25
	45-60	Clay loam	CL	A-6	0	0-5	90-100	85-100	75-100	60-80	30-40	10-20
Clayburn--------	0-13	Loam	CL, SC, CL-ML, SC-SM	A-4	0	0-5	80-100	75-100	65-95	45-75	25-30	5-10
	13-46	Clay loam	CL	A-6	0	0-5	80-100	75-100	65-100	50-80	30-40	10-20
	46-60	Loam	CL, CL-ML, SC-SM, SC	A-4	0	0-5	80-100	75-100	60-95	45-75	25-30	5-10
25:												
Cowestglen------	0-6	Sandy loam	SC-SM, SM	A-2, A-4	0	0	100	95-100	60-70	30-40	20-25	NP-5
	6-60	Stratified sand to loam	ML, CL-ML, SC-SM, SM	A-4	0	0	95-100	95-100	75-90	40-60	20-25	NP-5
26:												
Cryochrepts-----	0-8	Extremely stony loam	CL-ML, GC-GM, SC-SM	A-2, A-4	50-85	20-50	60-80	50-75	40-70	30-55	25-30	5-10
	8-16	Very cobbly loam, very cobbly sandy clay loam, cobbly clay loam	CL-ML, GC-GM, SC-SM	A-2, A-4	10-25	30-60	60-80	50-75	40-70	30-55	25-30	5-10
	16-60	Very flaggy loam, very flaggy clay loam	CL-ML, GC-GM, SC-SM	A-4	30-60	10-30	65-85	60-80	50-75	35-60	25-30	5-10

Table 14.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct	Pct					Pct	
26:												
Cryoborolls-----	0-9	Gravelly loam	CL, CL-ML, SC-SM, SC	A-4	0	5-10	75-100	70-95	60-90	40-70	25-30	5-10
	9-28	Very cobbly clay loam, very cobbly loam	CL	A-6	0	30-35	80-95	75-90	70-90	50-70	30-35	10-15
	28-42	Extremely cobbly clay loam, extremely cobbly loam	CL	A-6	0	40-50	80-95	75-90	70-90	50-70	30-35	10-15
	42-60	Very cobbly loam, very cobbly clay loam	CL	A-6	0-10	15-25	80-95	75-90	70-90	50-70	30-35	10-15
Rubble land-----	0-60	Fragmental material	GW	A-1	70-80	75-90	0-10	0-5	0-5	0	0-14	NP
27:												
Cryorthents-----	0-3	Very channery loam	GC, GC-GM	A-1, A-2, A-4	0-5	0-15	30-55	30-50	25-50	20-40	25-30	5-10
	3-25	Extremely channery loam	GC, GC-GM, GW-GC	A-1, A-2	0-5	0-15	10-30	10-25	10-25	5-20	25-30	5-10
	25-29	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
Rock outcrop----	0-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
28:												
Cumulic Haploborolls---	0-8	Gravelly sandy clay loam	GC-GM, SC, GC, SC-SM	A-1, A-2, A-4	0-10	0-15	60-80	55-75	45-70	20-40	25-30	5-10
	8-20	Very channery sandy clay loam	GC-GM, GC, GW-GC	A-1, A-2	0-5	0-10	30-55	30-50	25-45	10-30	25-30	5-10
	20-28	Clay loam	CL	A-6	0-5	0-10	85-100	80-100	75-100	60-80	30-35	10-15
	28-60	Stratified very gravelly sand to extremely gravelly loamy sand	GC-GM, GM, GW-GM, GW	A-1	0-25	0-25	35-55	30-50	20-40	0-15	20-25	NP-5

Table 14.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
29:												
Debeque---------	0-4	Very channery loam	GC, GC-GM	A-1, A-2	0	0-10	45-55	40-50	35-45	20-30	25-30	5-10
	4-7	Very channery sandy loam	GC-GM, GM, GW-GM	A-1	0	0	40-50	35-45	25-35	10-20	20-25	NP-5
	7-60	Extremely channery sandy loam	GW, GW-GM	A-1	0	0-15	10-30	10-25	5-20	0-10	20-25	NP-5
30:												
Debeque---------	0-4	Very channery loam	GC, GC-GM	A-1, A-2	0	0-10	45-55	40-50	35-45	20-30	25-30	5-10
	4-7	Very channery sandy loam	GC-GM, GW-GM, GM	A-1	0	0	40-50	35-45	25-35	10-20	20-25	NP-5
	7-60	Extremely channery sandy loam	GW, GW-GM	A-1	0	0-15	10-30	10-25	5-20	0-10	20-25	NP-5
Hesperus--------	0-7	Loam	CL, CL-ML	A-4	0	0	100	100	85-95	60-75	25-30	5-10
	7-60	Loam, clay loam	CL	A-6	0	0	90-100	85-100	75-100	60-80	30-40	10-20
31:												
Dominguez-------	0-3	Clay loam	CL	A-6	0	0	100	100	90-100	70-80	30-40	10-20
	3-60	Clay	CL	A-7	0	0	100	100	90-100	75-95	40-50	15-25
32:												
Dominguez-------	0-3	Clay loam	CL	A-6	0	0	100	100	90-100	70-80	30-40	10-20
	3-60	Clay	CL	A-7	0	0	100	100	90-100	75-95	40-50	15-25
33:												
Emmons----------	0-8	Loam	CL, CL-ML	A-4	0	0-10	90-100	85-100	75-95	55-75	25-30	5-10
	8-13	Silt loam	ML	A-4	0	0-10	90-100	85-100	75-100	60-90	30-35	5-10
	13-19	Silt loam	ML	A-4	0	0-10	90-100	85-95	75-95	60-85	30-35	5-10
	19-60	Silt loam	ML	A-4	0	0-10	90-100	85-95	75-95	60-85	30-35	5-10
Cerro-----------	0-7	Silty clay loam	ML	A-4, A-7, A-6	0	0	100	100	95-100	85-95	30-45	5-15
	7-12	Silty clay loam	ML	A-6, A-4, A-7	0	0	100	100	95-100	85-95	30-50	5-20
	12-35	Silty clay	MH, ML	A-7	0	0	100	100	95-100	90-95	45-70	15-35
	35-60	Silty clay loam	ML	A-4, A-7	0	0	100	100	95-100	85-95	30-50	5-15
Pagoda----------	0-6	Clay loam	CL	A-6	0	0	100	100	95-100	70-80	30-35	10-15
	6-17	Clay loam	CL	A-6	0	0	100	100	95-100	70-80	30-35	10-15
	17-27	Clay loam, clay	CL	A-6, A-7	0	0	100	100	95-100	70-95	35-50	15-25
	27-60	Clay loam, clay	CL	A-6, A-7	0	0	95-100	90-100	85-100	65-95	30-50	10-25

Table 14.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
34:												
Empedrado-------	0-10	Loam	CL, CL-ML	A-4	0	0	95-100	90-100	80-95	55-75	25-30	5-10
	10-21	Clay loam	CL	A-6	0	0	95-100	90-100	80-95	70-80	30-35	10-15
	21-28	Gravelly sandy clay loam	GC, GC-GM, SC-SM, SC	A-1, A-2, A-4	0	0	60-80	55-75	45-70	20-40	25-30	5-10
	28-60	Loam	CL, CL-ML	A-4	0	0	95-100	90-100	85-95	60-75	25-30	5-10
35:												
Empedrado-------	0-10	Loam	CL, CL-ML	A-4	0	0	95-100	90-100	80-95	55-75	25-30	5-10
	10-21	Clay loam	CL	A-6	0	0	95-100	90-100	80-95	70-80	30-35	10-15
	21-28	Gravelly sandy clay loam	GC, GC-GM, SC-SM, SC	A-2, A-1, A-4	0	0	60-80	55-75	45-70	20-40	25-30	5-10
	28-60	Loam	CL, CL-ML	A-4	0	0	95-100	90-100	85-95	60-75	25-30	5-10
Pagoda----------	0-6	Clay loam	CL	A-6	0	0	100	100	95-100	70-80	30-35	10-15
	6-17	Clay loam	CL	A-6	0	0	100	100	95-100	70-80	30-35	10-15
	17-27	Clay loam, clay	CL	A-6, A-7	0	0	100	100	95-100	70-95	35-50	15-25
	27-60	Clay loam, clay	CL	A-6, A-7	0	0	95-100	90-100	85-100	65-95	30-50	10-25
Godding---------	0-7	Stony loam	CL-ML, CL, SC, SC-SM	A-4	10-20	0-10	75-85	70-80	60-70	45-60	25-30	5-10
	7-27	Very stony clay	CL	A-7	30-40	30-40	80-90	75-85	70-80	60-80	40-50	20-25
	27-60	Very stony clay loam	CL	A-6	30-40	30-40	80-90	75-85	70-80	60-80	30-35	10-15
36:												
Fluvaquents-----	0-13	Variable	ML, SC, CL, SM	A-4, A-2, A-6	0	0-10	90-95	85-95	55-65	20-60	15-30	NP-15
	13-60	Stratified very gravelly sand to clay loam	GC, CL, GM, ML	A-2, A-1, A-4, A-6	0	0-10	50-90	45-85	30-80	20-75	20-35	NP-15
37:												
Fughes----------	0-7	Clay loam	CL	A-6	0	0	100	100	90-100	70-80	30-40	10-20
	7-18	Clay loam	CL	A-6	0	0	100	100	90-100	70-80	30-40	10-20
	18-50	Clay loam	CL	A-6, A-7	0	0	100	100	95-100	85-95	40-50	20-25
	50-60	Silty clay loam	CL	A-6, A-7	0	0	100	100	95-100	85-95	40-50	20-25
38:												
Fughes----------	0-7	Clay loam	CL	A-6	0	0	100	100	90-100	70-80	30-40	10-20
	7-18	Clay loam	CL	A-6	0	0	100	100	90-100	70-80	30-40	10-20
	18-50	Clay loam, silty clay loam	CL	A-6, A-7	0	0	100	100	95-100	85-95	40-50	20-25
	50-60	Silty clay loam	CL	A-6, A-7	0	0	100	100	95-100	85-95	40-50	20-25

Table 14.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas-ticity index
	In				Pct	Pct					Pct	
39:												
Fughes----------	0-7	Clay loam	CL	A-6	0	0	100	100	90-100	70-80	30-40	10-20
	7-18	Clay loam	CL	A-6	0	0	100	100	90-100	70-80	30-40	10-20
	18-50	Clay loam, silty clay loam	CL	A-6, A-7	0	0	100	100	95-100	85-95	40-50	20-25
	50-60	Silty clay loam	CL	A-6, A-7	0	0	100	100	95-100	85-95	40-50	20-25
Hesperus--------	0-7	Loam	CL, CL-ML	A-4	0	0	100	100	85-95	60-75	25-30	5-10
	7-60	Loam, clay loam	CL	A-6	0	0	90-100	85-100	75-100	60-80	30-40	10-20
40:												
Godding---------	0-7	Stony loam	CL-ML, CL, SC, SC-SM	A-4	10-20	0-10	75-85	70-80	60-70	45-60	25-30	5-10
	7-10	Very stony clay loam	CL	A-6	15-30	15-30	70-85	60-75	55-70	50-60	35-40	15-20
	10-27	Very stony clay	CL	A-7	30-40	30-40	80-90	75-85	70-80	60-80	40-50	20-25
	27-60	Very stony clay loam	CL	A-6	30-40	30-40	80-90	75-85	70-80	60-80	30-35	10-15
41:												
Golime----------	0-10	Cobbly loam	CL, CL-ML, SC-SM, SC	A-4	0-10	15-45	75-90	70-85	60-80	45-65	25-30	5-10
	10-15	Very cobbly clay, very cobbly clay loam	CL, GC, SC	A-2, A-6, A-7	0-25	20-70	45-90	40-85	35-85	30-70	40-50	20-25
	15-22	Very cobbly clay loam, very cobbly clay	CL, GC, SC	A-6, A-2, A-7	0-25	20-70	45-90	40-85	35-85	30-70	40-50	20-25
	22-34	Very stony clay loam	CL, GC, SC	A-2, A-6	25-70	0-50	45-90	40-85	35-85	30-70	30-35	10-15
	34-45	Extremely cobbly sandy clay loam	GC, SP-SC, GP-GC, SC	A-2, A-1, A-4	0-30	30-85	20-80	15-75	10-70	5-40	25-30	5-10
	45-60	Extremely stony sandy loam	GP-GC, SC, GC, SC-SM	A-1, A-2	30-85	0-80	20-80	15-75	10-50	5-30	25-30	5-10
42:												
Grobutte--------	0-4	Very channery loam	GC, GC-GM	A-2	0	0-5	35-55	30-50	25-45	20-35	25-30	5-10
	4-60	Extremely channery loam, very channery loam	GC, GC-GM	A-2	0	0-5	25-55	20-50	15-45	10-35	25-30	5-10

Table 14.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	Percentage passing sieve number--: 10	Percentage passing sieve number--: 40	Percentage passing sieve number--: 200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
43:												
Haploborolls----	0-6	Loam	CL, CL-ML	A-4	0	0	90-100	85-95	70-90	50-70	25-30	5-10
	6-11	Gravelly sandy clay loam	GC-GM, SC, GC, SC-SM	A-2, A-1, A-4	0	5-15	60-80	55-75	45-70	20-40	25-30	5-10
	11-22	Very stony loam	GC-GM, GC, SC, SC-SM	A-4	25-50	15-30	70-80	65-75	55-70	40-50	25-30	5-10
	22-32	Very cobbly sandy clay loam	GC, SC-SM, GC-GM, SC	A-1, A-2	10-20	40-50	60-70	55-65	45-60	20-35	25-30	5-10
	32-36	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
Rock outcrop----	0-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
44:												
Happle----------	0-7	Very channery sandy loam	GC, GC-GM, GW-GC	A-1, A-2	0	0-15	45-55	35-50	20-35	10-20	25-30	5-10
	7-14	Very channery sandy loam	GC, GW-GC, GC-GM	A-1, A-2	0	0-15	30-55	30-50	20-35	10-20	25-30	5-10
	14-32	Very channery sandy clay loam	GC-GM, GC, GW-GC	A-1, A-2	0	0-10	30-55	30-50	25-45	10-30	25-30	5-10
	32-60	Extremely channery sandy loam	GW, GW-GM	A-1	0	0-10	10-30	10-25	5-20	0-10	20-25	NP-5
45:												
Happle----------	0-7	Very channery sandy loam	GC, GW-GC, GC-GM	A-1, A-2	0	0-15	45-55	35-50	20-35	10-20	25-30	5-10
	7-14	Very channery sandy loam	GC, GW-GC, GC-GM	A-1, A-2	0	0-15	30-55	30-50	20-35	10-20	25-30	5-10
	14-32	Very channery sandy clay loam	GC, GC-GM, GW-GC	A-1, A-2	0	0-10	30-55	30-50	25-45	10-30	25-30	5-10
	32-60	Extremely channery sandy loam	GW, GW-GM	A-1	0	0-10	10-30	10-25	5-20	0-10	20-25	NP-5

Table 14.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	Percentage passing sieve number--: 10	Percentage passing sieve number--: 40	Percentage passing sieve number--: 200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
46:												
Happle----------	0-7	Very channery sandy loam	GC, GC-GM, GW-GC	A-1, A-2	0	0-15	45-55	35-50	20-35	10-20	25-30	5-10
	7-14	Very channery sandy loam	GC, GC-GM, GW-GC	A-1, A-2	0	0-15	30-55	30-50	20-35	10-20	25-30	5-10
	14-32	Very channery sandy clay loam	GC, GC-GM, GW-GC	A-1, A-2	0	0-10	30-55	30-50	25-45	10-30	25-30	5-10
	32-60	Extremely channery sandy loam	GW, GW-GM	A-1	0	0-10	10-30	10-25	5-20	0-10	20-25	NP-5
Rock outcrop----	0-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
47:												
Hesperus--------	0-7	Loam	CL, CL-ML	A-4	0	0	100	100	85-95	60-75	25-30	5-10
	7-60	Loam, clay loam	CL	A-6	0	0	90-100	85-100	75-100	60-80	30-40	10-20
Empedrado-------	0-10	Loam	CL, CL-ML	A-4	0	0	95-100	90-100	80-95	55-75	25-30	5-10
	10-21	Clay loam	CL	A-6	0	0	95-100	90-100	80-95	70-80	30-35	10-15
	21-28	Gravelly sandy clay loam	GC-GM, GC, SC, SC-SM	A-1, A-4, A-2	0	0	60-80	55-75	45-70	20-40	25-30	5-10
	28-60	Loam	CL, CL-ML	A-4	0	0	95-100	90-100	85-95	60-75	25-30	5-10
Pagoda----------	0-6	Clay loam	CL	A-6	0	0	100	100	95-100	70-80	30-35	10-15
	6-17	Clay loam	CL	A-6	0	0	100	100	95-100	70-80	30-35	10-15
	17-27	Clay loam, clay	CL	A-6, A-7	0	0	100	100	95-100	70-95	35-50	15-25
	27-60	Clay loam, clay	CL	A-6, A-7	0	0	95-100	90-100	85-100	65-95	30-50	10-25
48:												
Hesperus--------	0-7	Loam	CL, CL-ML	A-4	0	0	100	100	85-95	60-75	25-30	5-10
	7-60	Loam, clay loam	CL	A-6	0	0	90-100	85-100	75-100	60-80	30-40	10-20
Empedrado-------	0-10	Loam	CL, CL-ML	A-4	0	0	95-100	90-100	80-95	55-75	25-30	5-10
	10-21	Clay loam	CL	A-6	0	0	95-100	90-100	80-95	70-80	30-35	10-15
	21-28	Gravelly sandy clay loam	GC-GM, GC, SC, SC-SM	A-1, A-2, A-4	0	0	60-80	55-75	45-70	20-40	25-30	5-10
	28-60	Loam	CL, CL-ML	A-4	0	0	95-100	90-100	85-95	60-75	25-30	5-10
Pagoda----------	0-6	Clay loam	CL	A-6	0	0	100	100	95-100	70-80	30-35	10-15
	6-17	Clay loam	CL	A-6	0	0	100	100	95-100	70-80	30-35	10-15
	17-27	Clay loam, clay	CL	A-6, A-7	0	0	100	100	95-100	70-95	35-50	15-25
	27-60	Clay loam, clay	CL	A-6, A-7	0	0	95-100	90-100	85-100	65-95	30-50	10-25

Table 14.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
49:												
Hesperus----------	0-7	Loam	CL, CL-ML	A-4	0	0	100	100	85-95	60-75	25-30	5-10
	7-60	Loam, clay loam	CL	A-6	0	0	90-100	85-100	75-100	60-80	30-40	10-20
Pagoda------------	0-6	Clay loam	CL	A-6	0	0	100	100	95-100	70-80	30-35	10-15
	6-17	Clay loam	CL	A-6	0	0	100	100	95-100	70-80	30-35	10-15
	17-27	Clay loam, clay	CL	A-6, A-7	0	0	100	100	95-100	70-95	35-50	15-25
	27-60	Clay loam, clay	CL	A-6, A-7	0	0	95-100	90-100	85-100	65-95	30-50	10-25
50:												
Irigul------------	0-6	Channery loam	GC-GM, GC, SC, SC-SM	A-4	0	0-5	70-80	65-75	55-70	40-50	25-30	5-10
	6-13	Very channery loam	GC, GC-GM	A-1, A-2	0	0-10	25-45	20-40	15-35	10-30	25-30	5-10
	13-17	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
Starman-----------	0-1	Channery loam	GC-GM, GC, SC, SC-SM	A-4	0-10	0-25	55-80	55-75	50-70	35-50	25-30	5-10
	1-11	Extremely channery loam, very channery loam	GC, GC-GM	A-1, A-2	0-5	15-30	25-55	20-50	15-45	15-35	25-30	5-10
	11-15	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
51:												
Mesa--------------	0-3	Very fine sandy loam	CL, CL-ML	A-4	0	0	100	100	85-95	50-65	25-30	5-10
	3-12	Clay loam	CL	A-6	0	0	100	100	90-100	70-80	35-40	15-20
	12-26	Clay loam	CL	A-6	0	0	100	100	90-100	70-80	35-40	15-20
	26-38	Very gravelly clay loam	GC, GC-GM	A-1, A-4, A-2	0-25	0-25	35-55	30-50	30-50	20-40	25-30	5-10
	38-60	Very gravelly loam	GC, GC-GM	A-1, A-2, A-4	0-25	0-25	35-55	30-50	25-50	20-40	25-30	5-10
Avalon------------	0-6	Loam	CL, CL-ML	A-4	0	0	100	100	85-95	60-75	25-30	5-10
	6-16	Loam	CL, CL-ML	A-4	0	0	100	100	85-95	60-75	25-30	5-10
	16-40	Loam	CL, CL-ML	A-4	0	0	85-95	80-90	65-85	50-70	25-30	5-10
	40-60	Gravelly sandy loam	GC-GM, GM, SM, SC-SM	A-1, A-2	0	0	60-80	55-75	35-50	20-30	20-25	NP-5

Table 14.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
52:												
Northwater------	0-28	Loam	CL, CL-ML	A-4	0	0	100	100	85-95	60-75	25-30	5-10
	28-48	Very channery loam	GC, GC-GM	A-1, A-2, A-4	0-25	0-30	30-55	30-50	25-50	20-40	25-30	5-10
	48-60	Extremely channery loam	GC, GC-GM	A-2, A-1, A-4	0-25	0-30	30-55	30-50	25-50	20-40	25-30	5-10
Adel------------	0-20	Clay loam	CL	A-6	0	0-5	85-100	80-100	75-100	60-80	30-35	10-15
	20-31	Loam, clay loam	CL	A-6	0	0-5	85-100	80-100	65-95	60-80	30-35	10-15
	31-60	Loam, clay loam	CL	A-6	0	0-10	85-100	80-100	75-100	60-80	30-35	10-15
53:												
Pagoda----------	0-6	Clay loam	CL	A-6	0	0	100	100	95-100	70-80	30-35	10-15
	6-17	Clay loam	CL	A-6	0	0	100	100	95-100	70-80	30-35	10-15
	17-27	Clay loam, clay	CL	A-6, A-7	0	0	100	100	95-100	70-95	35-50	15-25
	27-60	Clay loam, clay	CL	A-6, A-7	0	0	95-100	90-100	85-100	65-95	30-50	10-25
Hesperus--------	0-7	Loam	CL, CL-ML	A-4	0	0	100	100	85-95	60-75	25-30	5-10
	7-60	Loam, clay loam	CL	A-6	0	0	90-100	85-100	75-100	60-80	30-40	10-20
54:												
Panitchen-------	0-7	Loam	CL-ML, ML	A-4	0	0	100	100	85-95	60-75	20-25	NP-5
	7-29	Stratified gravelly loam to gravelly clay loam	CL-ML, GC, CL, GC-GM	A-4, A-6	0-10	0-15	60-80	55-75	50-75	35-60	25-35	5-15
	29-60	Stratified sandy loam to loam	CL-ML, CL, SC, SC-SM	A-2, A-4	0	0	100	100	60-95	30-75	25-30	5-10
55:												
Parachute-------	0-10	Loam	CL, CL-ML	A-4	0	0	100	100	85-95	60-75	25-30	5-10
	10-25	Extremely channery loam, very channery loam	GC, GC-GM	A-2, A-1	0	5-30	45-55	15-50	10-45	5-35	25-30	5-10
	25-29	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
Irigul----------	0-6	Channery loam	GC-GM, SC, GC, SC-SM	A-4	0	0-5	70-80	65-75	55-70	40-50	25-30	5-10
	6-13	Very channery loam	GC, GC-GM	A-1, A-2	0	0-10	35-45	30-40	25-35	20-30	25-30	5-10
	13-17	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---

Table 14.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
56:												
Parachute-------	0-10	Loam	CL, CL-ML	A-4	0	0	100	100	85-95	60-75	25-30	5-10
	10-25	Extremely channery loam, very channery loam	GC, GC-GM	A-2, A-1	0	5-30	45-55	15-50	10-45	5-35	25-30	5-10
	25-29	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
Irigul----------	0-6	Channery loam	GC-GM, GC, SC, SC-SM	A-4	0	0-5	70-80	65-75	55-70	40-50	25-30	5-10
	6-13	Very channery loam	GC, GC-GM	A-1, A-2	0	0-10	35-45	30-40	25-35	20-30	25-30	5-10
	13-17	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
Rhone-----------	0-10	Loam	CL, CL-ML	A-4	0	0	100	100	85-95	60-75	25-30	5-10
	10-39	Channery loam	GC-GM, SC, GC, SC-SM	A-4	0	0	65-75	60-70	55-65	40-50	25-30	5-10
	39-55	Very channery loam	GC, GC-GM	A-1, A-2	0	0-5	35-45	30-40	25-35	20-30	25-30	5-10
	55-59	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
57:												
Parachute-------	0-10	Loam	CL, CL-ML	A-4	0	0	100	100	85-95	60-75	25-30	5-10
	10-25	Very channery loam	GC, GC-GM	A-2	0	5-10	45-55	40-50	35-45	25-35	25-30	5-10
	25-29	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
Rhone-----------	0-10	Loam	CL, CL-ML	A-4	0	0	100	100	85-95	60-75	25-30	5-10
	10-39	Channery loam	GC-GM, GC, SC, SC-SM	A-4	0	0	65-75	60-70	55-65	40-50	25-30	5-10
	39-55	Very channery loam	GC, GC-GM	A-1, A-2	0	0-5	35-45	30-40	25-35	20-30	25-30	5-10
	55-59	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
58:												
Peninsula-------	0-4	Loam	CL, CL-ML	A-4	0	0-10	85-100	80-100	70-95	50-75	25-30	5-10
	4-19	Clay loam	CL	A-6	0	0-10	85-100	80-100	75-100	60-80	30-40	10-20
	19-28	Clay loam	CL	A-6	0	0-10	85-100	80-100	75-100	60-95	35-40	15-20
	28-60	Loam	CL, CL-ML	A-4	0	0-15	85-100	80-100	70-90	50-75	25-30	5-10

Table 14.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
59:												
Persayo	0-3	Silty clay loam	ML	A-6, A-4, A-7	0	0	100	100	95-100	85-95	30-45	5-15
	3-15	Silt loam, silty clay loam	ML	A-4, A-6, A-7	0	0	100	100	95-100	85-95	30-45	5-15
	15-19	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
60:												
Redcreek	0-4	Sandy loam	SC-SM, SM	A-2, A-4	0	0	100	100	60-70	30-40	20-25	NP-5
	4-11	Sandy loam	SC-SM, SM	A-2, A-4	0	0	100	100	60-70	30-40	20-25	NP-5
	11-16	Channery sandy loam	SC-SM, SM	A-1, A-2	0	0-10	65-75	60-70	40-50	20-30	20-25	NP-5
	16-20	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
Rentsac	0-6	Channery loam	GC-GM, GC, SC, SC-SM	A-4	0	0-15	70-85	60-75	50-65	35-50	25-30	5-10
	6-19	Very channery loam	GC-GM, GM	A-2, A-1, A-4	0-5	0-10	30-55	30-50	25-50	20-40	20-25	NP-5
	19-22	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
61:												
Rock outcrop	0-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
Torriorthents	0-2	Channery loam	GC-GM, GC, SC, SC-SM	A-4	0	0-25	60-80	55-75	50-65	35-50	25-30	5-10
	2-13	Channery loam, very channery loam	GC, CL-ML, GC-GM, CL	A-2, A-1, A-4	0	0-15	30-90	30-85	25-85	20-65	25-30	5-10
	13-17	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
62:												
Shawa	0-20	Loam	CL, CL-ML	A-4	0	0	95-100	90-100	75-95	55-75	25-30	5-10
	20-32	Loam	CL, CL-ML	A-4	0	0	95-100	90-100	75-95	55-75	25-30	5-10
	32-60	Loam	CL, CL-ML	A-4	0	0	95-100	90-100	75-95	55-75	25-30	5-10
63:												
Silas	0-18	Loam	CL, CL-ML	A-4	0	0	90-100	85-100	70-85	60-75	25-30	5-10
	18-60	Clay loam	CL	A-6	0	0-5	90-100	85-100	75-85	65-80	30-35	10-15

Table 14.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
64:												
Torrifluvents---	0-6	Loam	CL, CL-ML	A-4	0	0	100	100	85-95	60-75	25-30	5-10
	6-60	Stratified sandy loam to silty clay loam	CL-ML, CL, SC, SC-SM	A-2, A-4, A-1, A-6	0	0	55-100	50-100	30-100	15-95	25-35	5-15
Gullied land----	0-60	Variable	---	---	---	---	---	---	---	---	---	---
65:												
Torriorthents---	0-2	Channery loam	GC, SC-SM, GC-GM, SC	A-4	0	0-25	60-80	55-75	50-65	35-50	25-30	5-10
	2-13	Channery loam, very channery loam	GC, CL-ML, GC-GM, CL	A-1, A-4, A-2	0	0-15	30-90	30-85	25-85	20-65	25-30	5-10
	13-17	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
Rock outcrop----	0-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
66:												
Torriorthents---	0-2	Channery loam	GC-GM, GC, SC, SC-SM	A-4	0	0-25	60-80	55-75	50-65	35-50	25-30	5-10
	2-13	Channery loam, very channery loam	GC, GC-GM, CL-ML, CL	A-1, A-2, A-4	0	0-15	30-90	30-85	25-85	20-65	25-30	5-10
	13-17	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
Rock outcrop----	0-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
67:												
Tosca-----------	0-8	Channery loam	GC, GC-GM	A-4	0	0	60-70	55-65	45-55	35-45	25-30	5-10
	8-46	Very channery loam	GC-GM, GM	A-1, A-2	0	5-15	30-50	25-50	20-40	15-30	20-25	NP-5
	46-60	Very channery loam	GC-GM, GM	A-1, A-2	0	10-25	35-60	25-60	20-45	15-35	20-25	NP-5
68:												
Trail-----------	0-5	Loamy sand	SC-SM, SM	A-2	0	0	100	100	50-75	15-30	20-25	NP-5
	5-60	Stratified loamy sand to sandy loam	SC-SM, SM	A-2, A-4	0	0	100	100	50-75	15-40	20-25	NP-5

Table 14.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas-ticity index
	In				Pct	Pct					Pct	
69:												
Travessilla-----	0-2	Fine sandy loam	SC, SC-SM	A-4	0	0	100	100	70-85	40-50	25-30	5-10
	2-9	Loam, sandy loam, fine sandy loam	SC, SC-SM	A-4	0	0	100	100	70-85	40-50	25-30	5-10
	9-13	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
Rock outcrop----	0-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
70:												
Uffens----------	0-5	Loam	CL, CL-ML	A-4	0	0	100	100	85-95	60-75	25-30	5-10
	5-20	Loam	CL, CL-ML	A-4	0	0	100	100	85-95	65-75	25-30	5-10
	20-27	Loam	CL, CL-ML	A-4	0	0	100	100	85-95	65-75	25-30	5-10
	27-60	Sandy loam	SC-SM, SM	A-2, A-4	0	0	100	100	60-70	30-40	20-25	NP-5
71:												
Utso------------	0-4	Channery loam	GC, GC-GM, SC-SM, SC	A-4	0	0	60-80	55-75	50-70	40-50	25-30	5-10
	4-11	Very channery loam	GC, GC-GM	A-2, A-4	0	0-5	35-50	30-50	25-45	20-40	25-30	5-10
	11-60	Extremely channery loam, very channery loam	GC, GC-GM	A-2, A-1	0	5-15	25-50	20-40	20-35	15-30	25-30	5-10
Rock outcrop----	0-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
72:												
Wesdy-----------	0-15	Stony loam	CL, CL-ML	A-4	10-45	5-15	75-90	70-85	60-80	50-65	25-30	5-10
	15-39	Very cobbly clay, very cobbly clay loam	CL	A-6, A-7	0-10	30-50	70-90	60-85	55-85	50-80	35-50	15-25
	39-60	Very cobbly clay, very cobbly clay loam	CL	A-6, A-7	0-10	35-60	75-95	70-90	65-90	50-80	35-50	15-25

Table 14.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
73:												
Wesdy-----------	0-15	Stony loam	CL, CL-ML	A-4	10-45	5-15	75-90	70-85	60-80	50-65	25-30	5-10
	15-39	Very cobbly clay, very cobbly clay loam	CL	A-6, A-7	0-10	30-50	70-90	60-85	55-85	50-80	35-50	15-25
	39-60	Very cobbly clay, very cobbly clay loam	CL	A-6, A-7	0-10	35-60	75-95	70-90	65-90	50-80	35-50	15-25
Northwater------	0-28	Loam	CL, CL-ML	A-4	0	0	100	100	85-95	60-75	25-30	5-10
	28-48	Very channery loam	GC, GC-GM	A-1, A-4, A-2	0-25	0-30	30-55	30-50	25-50	20-40	25-30	5-10
	48-60	Extremely channery loam	GC, GC-GM	A-2, A-1, A-4	0-25	0-30	30-55	30-50	25-50	20-40	25-30	5-10
74:												
Winnemucca------	0-19	Loam	CL, CL-ML	A-4	0	0-5	100	100	85-95	60-75	25-30	5-10
	19-28	Cobbly clay loam	CL	A-6	0	20-30	85-95	80-90	75-90	55-70	30-35	10-15
	28-36	Very cobbly clay loam	CL	A-6	0-5	40-50	80-90	75-85	70-80	60-80	30-40	10-15
	36-50	Very cobbly clay	CL	A-7	0-5	40-50	80-90	75-85	70-80	55-65	40-50	20-25
	50-60	Clay	CL	A-7	0	5-15	95-100	90-95	80-95	65-90	40-50	20-25
Castino---------	0-16	Loam	CL, CL-ML	A-4	0	0-5	100	100	85-95	60-75	25-30	5-10
	16-21	Cobbly clay loam	CL	A-6	0	15-30	95-100	90-100	80-100	65-80	30-35	10-15
	21-29	Very cobbly clay, very cobbly clay loam	CL	A-6, A-7	0-5	40-50	80-90	75-85	70-80	55-65	30-50	10-25
	29-38	Very cobbly clay	CL	A-7	0-5	40-50	80-90	75-85	70-80	60-80	40-50	20-25
	38-42	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
75:												
Wrayha----------	0-4	Gravelly sandy loam	GC, SC-SM, GC-GM, SC	A-1, A-2	0-5	0-5	60-80	55-75	35-50	20-30	25-30	5-10
	4-28	Clay loam	CL	A-6	0	0	100	100	90-100	70-80	35-40	15-20
	28-60	Silty clay loam, clay	CL	A-6, A-7	0	0	100	100	90-100	75-95	35-50	15-25

Table 14.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
75:												
Rabbitex	0-7	Loam	CL, CL-ML	A-4	0	0-5	85-100	80-100	70-95	50-65	25-30	5-10
	7-15	Sandy clay loam, loam	CL, CL-ML	A-4	0	0-5	85-100	80-100	70-95	50-65	20-25	5-10
	15-60	Channery sandy clay loam, channery loam	CL-ML, CL, SC, SC-SM	A-4	0	0-10	75-95	60-90	55-70	40-60	25-30	5-10
Veatch	0-6	Loam	CL, CL-ML	A-4	0	0	100	100	85-95	60-75	25-30	5-10
	6-11	Loam	CL, CL-ML	A-4	0	0	100	100	85-95	60-75	25-30	5-10
	11-32	Very channery sandy loam	GC, GC-GM, GW-GC	A-1, A-2	0-25	0-30	35-55	30-50	20-35	10-20	25-30	5-10
	32-36	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
76:												
Wrayha	0-4	Gravelly sandy loam	GC-GM, GC, SC, SC-SM	A-1, A-2	0-5	0-5	60-80	55-75	35-50	20-30	25-30	5-10
	4-28	Clay loam	CL	A-6	0	0	100	100	90-100	70-80	35-40	15-20
	28-60	Silty clay loam, clay	CL	A-6, A-7	0	0	100	100	90-100	75-95	35-50	15-25
Veatch	0-6	Loam	CL, CL-ML	A-4	0	0	100	100	85-95	60-75	25-30	5-10
	6-11	Loam	CL, CL-ML	A-4	0	0	100	100	85-95	60-75	25-30	5-10
	11-32	Very channery sandy loam	GC, GC-GM, GW-GC	A-1, A-2	0-25	0-30	35-55	30-50	20-35	10-20	25-30	5-10
	32-36	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
Rabbitex	0-7	Loam	CL, CL-ML	A-4	0	0-5	85-100	80-100	70-95	50-65	25-30	5-10
	7-15	Sandy clay loam, loam	CL, CL-ML	A-4	0	0-5	85-100	80-100	70-95	50-65	20-25	5-10
	15-60	Channery sandy clay loam, channery loam	CL-ML, SC, CL, SC-SM	A-4	0	0-10	75-95	60-90	55-70	40-60	25-30	5-10
77:												
Yamo	0-5	Sandy clay loam	CL-ML, CL, SC, SC-SM	A-4	0	0	100	100	80-90	35-55	20-25	5-10
	5-16	Sandy clay loam	CL, SC-SM, CL-ML, SC	A-4	0	0	100	100	80-90	35-55	25-30	5-10
	16-40	Sandy clay loam	CL-ML, CL, SC, SC-SM	A-4	0	0	100	100	80-90	35-55	25-30	5-10
	40-60	Sandy loam	SC, SC-SM	A-2, A-4	0	0-5	100	100	60-70	30-40	25-30	5-10

Table 14.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
77:												
Redcreek--------	0-4	Sandy loam	SC-SM, SM	A-2, A-4	0	0	100	100	60-70	30-40	20-25	NP-5
	4-11	Sandy loam	SC-SM, SM	A-2, A-4	0	0	100	100	60-70	30-40	20-25	NP-5
	11-16	Channery sandy loam	SC-SM, SM	A-1, A-2	0	0-10	65-75	60-70	40-50	20-30	20-25	NP-5
	16-20	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
78:												
Youngston-------	0-4	Loam	CL, CL-ML	A-4	0	0	95-100	90-100	85-95	60-75	25-30	5-10
	4-60	Stratified fine sandy loam to loam	CL, CL-ML	A-4	0	0	95-100	90-100	65-95	50-75	25-30	5-10
79:												
Water.												

Table 15.--Physical Properties of the Soils

(Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" and "Wind erodibility index" apply only to the surface layer. Absence of an entry indicates that data were not estimated.)

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability (Ksat)	Available water capacity	Linear extensibility	Organic matter	Erosion factors Kw	Erosion factors Kf	Erosion factors T	Wind erodibility group	Wind erodibility index
	In	Pct	g/cc	In/hr	In/in	Pct	Pct					
1:												
Aga	0-3	10-18	1.35-1.50	2-6	0.14-0.17	0.0-2.9	0.5-1.0	.32	.32	4	3	86
	3-28	10-15	1.35-1.60	0.6-2	0.08-0.11	0.0-2.9	0.0-0.5	.24	.24			
	28-60	0-5	1.45-1.60	20-101	0.01-0.02	0.0-2.9	0.0-0.5	.02	.20			
2:												
Badland	0-60	---	---	---	---	---	---	---	---	-	8	0
3:												
Barx	0-3	18-27	1.25-1.40	0.6-2	0.14-0.17	0.0-2.9	1.0-2.0	.28	.28	5	4L	86
	3-14	27-32	1.25-1.40	0.2-0.6	0.17-0.20	3.0-5.9	0.5-1.0	.24	.24			
	14-40	20-27	1.25-1.40	0.6-2	0.14-0.17	0.0-2.9	0.0-0.5	.43	.43			
	40-60	14-27	1.25-1.40	0.6-6	0.14-0.17	0.0-2.9	0.0-0.5	.43	.43			
4:												
Barx	0-3	18-27	1.25-1.40	0.6-2	0.14-0.17	0.0-2.9	1.0-2.0	.28	.28	5	4L	86
	3-14	27-32	1.25-1.40	0.2-0.6	0.17-0.20	3.0-5.9	0.5-1.0	.24	.24			
	14-40	20-27	1.25-1.40	0.6-2	0.14-0.17	0.0-2.9	0.0-0.5	.43	.43			
	40-60	14-27	1.25-1.40	0.6-6	0.14-0.17	0.0-2.9	0.0-0.5	.43	.43			
Clapper	0-3	18-27	1.25-1.40	0.6-2	0.07-0.09	0.0-2.9	1.0-2.0	.10	.28	2	8	0
	3-12	18-27	1.25-1.40	0.6-2	0.07-0.09	0.0-2.9	0.5-1.0	.15	.37			
	12-26	18-27	1.25-1.40	0.6-2	0.07-0.09	0.0-2.9	0.5-1.0	.15	.37			
	26-60	18-27	1.25-1.40	0.6-2	0.07-0.09	0.0-2.9	0.0-0.5	.15	.43			
5:												
Battlement	0-6	18-27	1.25-1.40	0.6-2	0.15-0.16	0.0-2.9	0.5-1.0	.37	.37	5	4L	86
	6-45	18-32	1.15-1.50	0.6-2	0.18-0.20	0.0-2.9	0.5-1.0	.28	.28			
	45-60	15-25	1.25-1.50	0.6-6	0.13-0.16	0.0-2.9	0.5-1.0	.32	.32			
6:												
Battlement	0-6	18-27	1.25-1.40	0.6-2	0.13-0.16	0.0-2.9	0.5-1.0	.37	.37	5	4L	86
	6-15	15-20	1.35-1.50	0.6-2	0.11-0.14	0.0-2.9	0.5-1.0	.24	.24			
	15-60	18-35	1.15-1.50	0.2-2	0.13-0.16	0.0-2.9	0.5-1.0	.28	.28			
7:												
Biedsaw	0-4	20-27	1.25-1.40	0.6-2	0.10-0.13	0.0-2.9	0.5-1.0	.20	.37	5	4L	86
	4-9	20-27	1.25-1.40	0.6-2	0.14-0.18	0.0-2.9	0.5-1.0	.37	.37			
	9-43	30-45	1.15-1.40	0.2-0.6	0.17-0.21	3.0-5.9	0.0-0.5	.28	.28			
	43-60	35-45	1.15-1.30	0.06-0.2	0.14-0.21	3.0-5.9	0.0-0.5	.28	.28			
Sunup	0-4	18-27	1.25-1.40	0.6-2	0.10-0.13	0.0-2.9	0.5-1.0	.20	.37	1	4L	86
	4-11	18-27	1.25-1.40	0.6-2	0.07-0.10	0.0-2.9	0.5-1.0	.15	.37			
	11-15	---	---	0.06-0.2	---	---	---	---	---			
8:												
Billings	0-7	27-35	1.15-1.30	0.06-0.2	0.17-0.21	3.0-5.9	0.0-0.5	.32	.32	5	4L	86
	7-43	27-35	1.15-1.40	0.06-0.2	0.17-0.21	3.0-5.9	0.0-0.5	.37	.37			
	43-60	10-20	1.30-1.50	0.6-2	0.13-0.15	0.0-2.9	0.0-0.5	.32	.32			
9:												
Bookcliff	0-2	18-27	1.25-1.40	0.6-2	0.15-0.18	0.0-2.9	2.0-4.0	.24	.24	3	6	48
	2-18	20-32	1.25-1.40	0.2-0.6	0.15-0.18	0.0-2.9	1.0-2.0	.28	.28			
	18-36	18-27	1.25-1.40	0.6-2	0.10-0.13	0.0-2.9	0.5-1.0	.20	.37			
	36-42	18-27	1.25-1.40	0.6-2	0.10-0.13	0.0-2.9	0.5-1.0	.20	.37			
	42-60	18-27	1.25-1.40	0.6-2	0.07-0.09	0.0-2.9	0.0-0.5	.15	.43			

Table 15.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability (Ksat)	Available water capacity	Linear extensibility	Organic matter	Erosion factors Kw	Kf	T	Wind erodibility group	Wind erodibility index
	In	Pct	g/cc	In/hr	In/in	Pct	Pct					
9:												
Utso	0-4	18-27	1.25-1.40	0.6-2	0.10-0.13	0.0-2.9	2.0-3.0	.15	.28	4	6	48
	4-11	18-27	1.25-1.40	0.6-2	0.07-0.09	0.0-2.9	1.0-2.0	.10	.28			
	11-44	18-27	1.25-1.40	0.6-2	0.07-0.09	0.0-2.9	0.5-1.0	.15	.37			
	44-48	---	---	0.06-0.2	---	---	---	---	---			
10:												
Borollic Calciorthids	0-4	20-25	1.25-1.40	0.6-2	0.14-0.17	0.0-2.9	0.5-1.0	.37	.37	2	4L	86
	4-11	30-35	1.15-1.40	0.2-0.6	0.15-0.18	0.0-2.9	0.0-0.5	.32	.32			
	11-60	18-30	1.15-1.40	0.2-2	0.12-0.18	0.0-2.9	0.0-0.5	.37	.37			
11:												
Borpark	0-2	15-24	1.25-1.40	0.6-6	0.10-0.13	0.0-2.9	1.0-2.0	.15	.28	5	4L	86
	2-8	27-34	1.25-1.40	0.2-0.6	0.13-0.16	3.0-5.9	0.5-1.0	.15	.24			
	8-41	27-34	1.25-1.40	0.2-0.6	0.09-0.11	3.0-5.9	0.5-1.0	.10	.24			
	41-60	20-30	1.15-1.30	0.6-2	0.04-0.06	0.0-2.9	0.0-0.5	.05	.49			
	60-66	12-18	1.35-1.45	2-6	0.03-0.04	0.0-2.9	0.0-0.5	.05	.32			
12:												
Bunkwater	0-2	15-20	1.35-1.50	0.6-6	0.14-0.17	0.0-2.9	0.5-1.0	.32	.32	5	3	86
	2-13	20-35	1.25-1.40	0.2-0.6	0.14-0.17	0.0-2.9	0.5-1.0	.24	.24			
	13-33	20-35	1.25-1.40	0.2-0.6	0.14-0.17	0.0-2.9	0.0-0.5	.28	.28			
	33-60	20-35	1.15-1.40	0.2-0.6	0.14-0.17	0.0-2.9	0.0-0.5	.28	.28			
13:												
Caballo	0-6	16-27	1.25-1.40	0.6-6	0.07-0.09	0.0-2.9	3.0-5.0	.05	.20	4	8	0
	6-18	18-27	1.25-1.40	0.6-2	0.07-0.09	0.0-2.9	1.0-3.0	.10	.28			
	18-44	18-27	1.25-1.40	0.6-2	0.04-0.05	0.0-2.9	0.0-1.0	.05	.37			
	44-48	---	---	0.06-0.2	---	---	---	---	---			
14:												
Callings	0-11	15-22	1.25-1.40	0.6-6	0.14-0.18	0.0-2.9	4.0-6.0	.20	.20	3	5	56
	11-15	12-18	1.25-1.40	2-6	0.14-0.18	0.0-2.9	0.5-1.0	.37	.37			
	15-46	35-45	1.15-1.30	0.06-0.2	0.07-0.08	3.0-5.9	0.5-1.0	.05	.17			
	46-60	40-50	1.15-1.30	0.06-0.2	0.07-0.08	3.0-5.9	0.0-0.5	.05	.17			
15:												
Cameo	0-4	8-14	1.35-1.50	2-6	0.13-0.15	0.0-2.9	0.5-1.0	.28	.28	5	3	86
	4-60	7-18	1.25-1.60	2-6	0.10-0.12	0.0-2.9	0.0-0.5	.24	.24			
16:												
Castino	0-16	20-27	1.25-1.30	0.6-2	0.14-0.17	0.0-2.9	4.0-8.0	.20	.20	2	6	48
	16-21	35-40	1.25-1.40	0.2-0.6	0.13-0.16	3.0-5.9	1.0-3.0	.10	.20			
	21-29	35-40	1.25-1.40	0.2-0.6	0.09-0.11	3.0-5.9	1.0-2.0	.05	.20			
	29-38	40-45	1.15-1.30	0.06-0.2	0.07-0.08	6.0-8.9	0.5-1.0	.05	.17			
	38-42	---	---	0.06-0.2	---	---	---	---	---			
Skisams	0-15	15-27	1.25-1.40	0.6-6	0.13-0.16	0.0-2.9	2.0-4.0	.24	.24	1	6	48
	15-19	18-27	1.25-1.40	0.6-2	0.11-0.13	0.0-2.9	0.5-2.0	.20	.37			
	19-23	---	---	0.06-0.2	---	---	---	---	---			
Winnemucca	0-19	20-27	1.25-1.40	0.6-2	0.14-0.17	0.0-2.9	2.0-5.0	.20	.20	5	6	48
	19-28	27-38	1.25-1.40	0.2-0.6	0.13-0.16	0.0-2.9	1.0-2.0	.10	.20			
	28-36	30-38	1.25-1.40	0.06-0.6	0.09-0.11	0.0-2.9	0.5-1.0	.10	.24			
	36-50	40-50	1.15-1.30	0.06-0.2	0.07-0.08	3.0-5.9	0.5-1.0	.05	.17			
	50-60	40-50	1.15-1.30	0.06-0.2	0.14-0.17	3.0-5.9	0.0-0.5	.17	.17			

Table 15.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility (Ksat)	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors Kw	Kf	T	Wind erodi- bility group	Wind erodi- bility index
	In	Pct	g/cc	In/hr	In/in	Pct	Pct					
17:												
Cathedral-----------	0-5	5-18	1.35-1.50	2-6	0.05-0.08	0.0-2.9	1.0-2.0	.10	.24	1	8	0
	5-11	10-18	1.35-1.50	2-6	0.05-0.07	0.0-2.9	0.5-2.0	.05	.28			
	11-15	---	---	0.06-0.2	---	---	---	---	---			
Veatch--------------	0-6	10-20	1.25-1.40	0.6-6	0.14-0.17	0.0-2.9	1.0-3.0	.28	.28	2	5	56
	6-11	10-20	1.25-1.40	0.6-2	0.14-0.17	0.0-2.9	0.5-1.0	.37	.37			
	11-32	15-20	1.35-1.50	0.6-6	0.05-0.07	0.0-2.9	0.0-0.5	.10	.32			
	32-36	---	---	0.06-0.2	---	---	---	---	---			
18:												
Cerro---------------	0-7	30-35	1.15-1.30	0.2-0.6	0.17-0.21	3.0-5.9	1.0-2.0	.28	.28	5	7	38
	7-12	35-40	1.15-1.30	0.06-0.6	0.17-0.21	3.0-5.9	0.5-1.0	.32	.32			
	12-35	40-50	1.15-1.30	0.06-0.2	0.14-0.17	6.0-8.9	0.5-1.0	.24	.24			
	35-60	27-40	1.15-1.30	0.06-0.6	0.17-0.21	3.0-5.9	0.0-0.5	.37	.37			
19:												
Cerro---------------	0-7	30-35	1.15-1.30	0.2-0.6	0.17-0.21	3.0-5.9	1.0-2.0	.28	.28	5	7	38
	7-12	35-40	1.15-1.30	0.06-0.6	0.17-0.21	3.0-5.9	0.5-1.0	.32	.32			
	12-35	40-50	1.15-1.30	0.06-0.2	0.14-0.17	6.0-8.9	0.5-1.0	.24	.24			
	35-60	27-40	1.15-1.30	0.06-0.6	0.17-0.21	3.0-5.9	0.0-0.5	.37	.37			
20:												
Cerro---------------	0-7	30-35	1.15-1.30	0.2-0.6	0.17-0.21	3.0-5.9	1.0-2.0	.28	.28	5	7	38
	7-12	35-40	1.15-1.30	0.06-0.6	0.17-0.21	3.0-5.9	0.5-1.0	.32	.32			
	12-35	40-50	1.15-1.30	0.06-0.2	0.14-0.17	6.0-8.9	0.5-1.0	.24	.24			
	35-60	27-40	1.15-1.30	0.06-0.6	0.17-0.21	3.0-5.9	0.0-0.5	.37	.37			
21:												
Chipeta-------------	0-4	30-40	1.15-1.30	0.06-0.6	0.17-0.20	3.0-5.9	0.5-1.0	.32	.32	2	4L	86
	4-13	35-45	1.15-1.30	0.06-0.2	0.14-0.21	3.0-5.9	0.0-0.5	.37	.37			
	13-17	---	---	---	---	---	---	---	---			
22:												
Clapper-------------	0-3	18-27	1.25-1.40	0.6-2	0.07-0.09	0.0-2.9	1.0-2.0	.10	.28	2	8	0
	3-12	18-27	1.25-1.40	0.6-2	0.07-0.09	0.0-2.9	0.5-1.0	.15	.37			
	12-26	18-27	1.25-1.40	0.6-2	0.07-0.09	0.0-2.9	0.5-1.0	.15	.37			
	26-60	18-27	1.25-1.40	0.6-2	0.07-0.09	0.0-2.9	0.0-0.5	.15	.43			
23:												
Clapper-------------	0-3	18-27	1.25-1.40	0.6-2	0.07-0.09	0.0-2.9	1.0-2.0	.10	.28	2	8	0
	3-12	18-27	1.25-1.40	0.6-2	0.07-0.09	0.0-2.9	0.5-1.0	.15	.37			
	12-26	18-27	1.25-1.40	0.6-2	0.07-0.09	0.0-2.9	0.5-1.0	.15	.37			
	26-60	18-27	1.25-1.40	0.6-2	0.07-0.09	0.0-2.9	0.0-0.5	.15	.43			
24:												
Cochetopa-----------	0-20	27-34	1.25-1.40	0.2-0.6	0.17-0.20	3.0-5.9	3.0-6.0	.15	.15	5	6	48
	20-33	35-40	1.25-1.40	0.2-0.6	0.17-0.20	3.0-5.9	1.0-3.0	.20	.20			
	33-45	40-55	1.15-1.30	0.06-0.2	0.14-0.16	6.0-8.9	1.0-2.0	.15	.15			
	45-60	27-34	1.25-1.40	0.2-0.6	0.17-0.20	3.0-5.9	0.5-1.0	.24	.24			
Clayburn------------	0-13	15-25	1.25-1.40	0.6-6	0.14-0.17	0.0-2.9	2.0-4.0	.24	.24	5	5	56
	13-46	27-34	1.25-1.40	0.2-0.6	0.17-0.20	3.0-5.9	1.0-2.0	.20	.20			
	46-60	15-25	1.25-1.40	0.6-6	0.14-0.17	0.0-2.9	0.5-1.0	.37	.37			
25:												
Cowestglen----------	0-6	5-15	1.35-1.50	2-6	0.10-0.13	0.0-2.9	0.5-1.0	.28	.28	5	3	86
	6-60	5-18	1.25-1.60	2-6	0.11-0.14	0.0-2.9	0.5-1.0	.20	.20			

Table 15.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility (Ksat)	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors Kw	Kf	T	Wind erodi- bility group	Wind erodi- bility index
	In	Pct	g/cc	In/hr	In/in	Pct	Pct					
26:												
Cryochrepts	0-8	15-25	1.25-1.40	0.6-6	0.04-0.06	0.0-2.9	0.5-1.0	.05	.37	3	8	0
	8-16	15-30	1.25-1.40	0.6-6	0.07-0.09	0.0-2.9	0.5-1.0	.15	.37			
	16-60	20-30	1.25-1.40	0.2-2	0.07-0.11	0.0-2.9	0.0-0.5	.10	.28			
Cryoborolls	0-9	18-27	1.25-1.40	0.6-2	0.10-0.13	0.0-2.9	2.0-3.0	.15	.28	3	6	48
	9-28	25-32	1.25-1.40	0.2-0.6	0.07-0.11	0.0-2.9	1.0-2.0	.10	.28			
	28-42	25-32	1.25-1.40	0.2-0.6	0.06-0.08	0.0-2.9	0.5-1.0	.05	.37			
	42-60	25-32	1.25-1.40	0.2-0.6	0.07-0.11	0.0-2.9	0.0-0.5	.15	.43			
Rubble land	0-60	0-0	1.70-2.35	20-101	0.00-0.10	0.0-2.9	0.0-0.1	---	---	-	8	0
27:												
Cryorthents	0-3	15-20	1.25-1.40	0.6-6	0.07-0.09	0.0-2.9	0.5-1.0	.15	.37	3	8	0
	3-25	15-20	1.25-1.40	0.6-2	0.04-0.06	0.0-2.9	0.0-0.5	.05	.43			
	25-29	---	---	0.06-2	---	---	---	---	---			
Rock outcrop	0-60	---	---	---	0.00-0.00	---	---	---	---	-	8	0
28:												
Cumulic Haploborolls	0-8	20-30	1.25-1.40	0.2-2	0.10-0.13	0.0-2.9	2.0-3.0	.10	.17	3	5	56
	8-20	20-30	1.25-1.40	0.2-2	0.07-0.09	0.0-2.9	1.0-2.0	.05	.17			
	20-28	27-35	1.25-1.40	0.2-2	0.16-0.19	0.0-2.9	1.0-2.0	.20	.20			
	28-60	5-15	1.45-1.60	6-20	0.03-0.04	0.0-2.9	1.0-2.0	.05	.15			
29:												
Debeque	0-4	15-25	1.25-1.40	2-6	0.07-0.10	0.0-2.9	1.0-3.0	.10	.28	2	8	0
	4-7	10-20	1.35-1.50	2-6	0.05-0.07	0.0-2.9	1.0-2.0	.10	.24			
	7-60	10-20	1.35-1.50	2-6	0.03-0.04	0.0-2.9	0.0-0.5	.05	.32			
30:												
Debeque	0-4	15-25	1.25-1.40	2-6	0.07-0.10	0.0-2.9	1.0-3.0	.10	.28	2	8	0
	4-7	10-20	1.35-1.50	2-6	0.05-0.07	0.0-2.9	1.0-2.0	.10	.24			
	7-60	10-20	1.35-1.50	2-6	0.03-0.04	0.0-2.9	0.0-0.5	.05	.32			
Hesperus	0-7	10-20	1.25-1.40	0.6-6	0.14-0.17	0.0-2.9	2.0-5.0	.20	.20	5	5	56
	7-60	20-35	1.25-1.40	0.2-0.6	0.17-0.20	3.0-5.9	1.0-2.0	.20	.20			
31:												
Dominguez	0-3	27-34	1.25-1.40	0.2-0.6	0.17-0.20	3.0-5.9	0.5-1.0	.24	.24	5	4L	86
	3-60	40-50	1.15-1.30	0.06-0.2	0.14-0.16	6.0-8.9	0.0-0.5	.17	.17			
32:												
Dominguez	0-3	27-34	1.25-1.40	0.2-0.6	0.17-0.20	3.0-5.9	0.5-1.0	.24	.24	5	4L	86
	3-60	40-50	1.15-1.30	0.06-0.2	0.14-0.16	6.0-8.9	0.0-0.5	.17	.17			
33:												
Emmons	0-8	18-27	1.25-1.40	0.6-2	0.14-0.17	0.0-2.9	1.0-3.0	.28	.28	5	4L	86
	8-13	18-27	1.15-1.30	0.6-2	0.14-0.17	0.0-2.9	0.5-1.0	.43	.43			
	13-19	18-27	1.15-1.30	0.6-2	0.14-0.17	0.0-2.9	0.0-0.5	.49	.49			
	19-60	18-27	1.15-1.30	0.6-2	0.14-0.17	0.0-2.9	0.0-0.5	.49	.49			
Cerro	0-7	30-35	1.15-1.30	0.2-0.6	0.17-0.21	3.0-5.9	1.0-2.0	.28	.28	5	7	38
	7-12	35-40	1.15-1.30	0.06-0.6	0.17-0.21	3.0-5.9	0.5-1.0	.32	.32			
	12-35	40-50	1.15-1.30	0.06-0.2	0.14-0.17	6.0-8.9	0.5-1.0	.24	.24			
	35-60	27-40	1.15-1.30	0.06-0.6	0.17-0.21	3.0-5.9	0.0-0.5	.37	.37			
Pagoda	0-6	27-35	1.25-1.40	0.2-0.6	0.17-0.21	3.0-5.9	2.0-3.0	.20	.20	5	6	48
	6-17	27-35	1.25-1.40	0.2-0.6	0.17-0.21	3.0-5.9	1.0-3.0	.20	.20			
	17-27	35-50	1.15-1.40	0.06-0.2	0.14-0.21	6.0-8.9	0.5-1.0	.32	.20			
	27-60	30-50	1.15-1.40	0.06-0.6	0.14-0.21	3.0-5.9	0.0-0.5	.20	.20			

Table 15.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility (Ksat)	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors Kw	Erosion factors Kf	Erosion factors T	Wind erodi- bility group	Wind erodi- bility index
	In	Pct	g/cc	In/hr	In/in	Pct	Pct					
34:												
Empedrado	0-10	18-27	1.25-1.40	0.6-2	0.16-0.18	0.0-2.9	2.0-4.0	.24	.24	5	6	48
	10-21	27-35	1.25-1.40	0.6-2	0.17-0.21	3.0-5.9	0.5-1.0	.24	.24			
	21-28	20-30	1.25-1.40	0.6-2	0.10-0.13	0.0-2.9	0.5-1.0	.10	.20			
	28-60	18-27	1.25-1.40	0.6-2	0.14-0.18	0.0-2.9	0.0-0.5	.43	.43			
35:												
Empedrado	0-10	18-27	1.25-1.40	0.6-2	0.16-0.18	0.0-2.9	2.0-4.0	.24	.24	5	6	48
	10-21	27-35	1.25-1.40	0.6-2	0.17-0.21	3.0-5.9	0.5-1.0	.24	.24			
	21-28	20-30	1.25-1.40	0.6-2	0.10-0.13	0.0-2.9	0.5-1.0	.10	.20			
	28-60	18-27	1.25-1.40	0.6-2	0.14-0.18	0.0-2.9	0.0-0.5	.43	.43			
Pagoda	0-6	27-35	1.25-1.40	0.2-0.6	0.17-0.21	3.0-5.9	2.0-3.0	.20	.20	5	6	48
	6-17	27-35	1.25-1.40	0.2-0.6	0.17-0.21	3.0-5.9	1.0-3.0	.20	.20			
	17-27	35-50	1.15-1.40	0.06-0.2	0.14-0.21	6.0-8.9	0.5-1.0	.32	.20			
	27-60	30-50	1.15-1.40	0.06-0.6	0.14-0.21	3.0-5.9	0.0-0.5	.20	.20			
Godding	0-7	17-25	1.25-1.40	0.6-6	0.10-0.13	0.0-2.9	2.0-3.0	.15	.28	5	6	48
	7-27	40-50	1.15-1.30	0.06-0.2	0.07-0.08	3.0-5.9	0.5-1.0	.05	.17			
	27-60	27-34	1.25-1.40	0.2-0.6	0.09-0.11	0.0-2.9	0.5-1.0	.10	.24			
36:												
Fluvaquents	0-13	5-30	1.20-1.50	0.6-20	0.07-0.16	0.0-2.9	0.5-1.0	---	---	3	8	0
	13-60	5-35	1.35-1.55	0.2-2	0.10-0.20	0.0-2.9	0.0-0.5	.17	.32			
37:												
Fughes	0-7	27-34	1.25-1.40	0.2-0.6	0.17-0.20	3.0-5.9	2.0-4.0	.17	.17	5	6	48
	7-18	27-34	1.25-1.40	0.2-0.6	0.17-0.20	3.0-5.9	1.0-3.0	.20	.20			
	18-50	35-40	1.15-1.30	0.06-0.2	0.17-0.20	6.0-8.9	1.0-2.0	.28	.28			
	50-60	27-34	1.15-1.30	0.2-0.6	0.17-0.20	3.0-5.9	0.5-1.0	.32	.32			
38:												
Fughes	0-7	27-34	1.25-1.40	0.2-0.6	0.17-0.20	3.0-5.9	2.0-4.0	.17	.17	5	6	48
	7-18	27-34	1.25-1.40	0.2-0.6	0.17-0.20	3.0-5.9	1.0-3.0	.20	.20			
	18-50	35-40	1.15-1.30	0.06-0.2	0.17-0.20	6.0-8.9	1.0-2.0	.28	.28			
	50-60	27-34	1.15-1.30	0.2-0.6	0.17-0.20	3.0-5.9	0.5-1.0	.32	.32			
39:												
Fughes	0-7	27-34	1.25-1.40	0.2-0.6	0.17-0.20	3.0-5.9	2.0-4.0	.17	.17	5	6	48
	7-18	27-34	1.25-1.40	0.2-0.6	0.17-0.20	3.0-5.9	1.0-3.0	.20	.20			
	18-50	35-40	1.15-1.30	0.06-0.2	0.17-0.20	6.0-8.9	1.0-2.0	.28	.28			
	50-60	27-34	1.15-1.30	0.2-0.6	0.17-0.20	3.0-5.9	0.5-1.0	.32	.32			
Hesperus	0-7	10-20	1.25-1.40	0.6-6	0.14-0.17	0.0-2.9	2.0-5.0	.20	.20	5	5	56
	7-60	20-35	1.25-1.40	0.2-0.6	0.17-0.20	3.0-5.9	1.0-2.0	.20	.20			
40:												
Godding	0-7	17-25	1.25-1.40	0.6-6	0.10-0.13	0.0-2.9	2.0-3.0	.15	.28	5	6	48
	7-10	35-40	1.25-1.40	0.2-0.6	0.09-0.11	0.0-2.9	1.0-2.0	.05	.20			
	10-27	40-50	1.15-1.30	0.06-0.2	0.07-0.08	3.0-5.9	0.5-1.0	.05	.17			
	27-60	27-34	1.25-1.40	0.2-0.6	0.09-0.11	0.0-2.9	0.5-1.0	.10	.24			
41:												
Golime	0-10	17-25	1.25-1.40	0.6-6	0.10-0.13	0.0-2.9	2.0-3.0	.15	.28	5	6	48
	10-15	35-45	1.25-1.40	0.06-0.2	0.09-0.11	0.0-2.9	1.0-2.0	.05	.20			
	15-22	35-45	1.25-1.40	0.06-0.2	0.09-0.11	0.0-2.9	1.0-2.0	.05	.20			
	22-34	27-34	1.25-1.40	0.2-0.6	0.09-0.11	0.0-2.9	0.5-1.0	.10	.24			
	34-45	20-30	1.25-1.40	0.2-2	0.04-0.05	0.0-2.9	0.5-1.0	.02	.20			
	45-60	13-20	1.35-1.50	0.6-6	0.03-0.04	0.0-2.9	0.0-0.5	.05	.32			

Table 15.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility (Ksat)	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors Kw	Erosion factors Kf	Erosion factors T	Wind erodi- bility group	Wind erodi- bility index
	In	Pct	g/cc	In/hr	In/in	Pct	Pct					
42:												
Grobutte	0-4	23-27	1.25-1.40	0.6-2	0.07-0.09	0.0-2.9	1.0-3.0	.10	.28	5	8	0
	4-60	20-27	1.25-1.40	0.6-2	0.07-0.09	0.0-2.9	0.0-1.0	.15	.37			
43:												
Haploborolls	0-6	20-25	1.25-1.40	0.6-2	0.14-0.17	0.0-2.9	1.0-3.0	.28	.28	2	6	48
	6-11	20-25	1.25-1.40	0.6-2	0.10-0.13	0.0-2.9	1.0-2.0	.10	.17			
	11-22	20-25	1.25-1.40	0.6-2	0.07-0.09	0.0-2.9	0.5-1.0	.15	.37			
	22-32	20-25	1.25-1.40	0.6-2	0.07-0.09	0.0-2.9	0.0-0.5	.10	.24			
	32-36	---	---	0.06-0.2	---	---	---	---	---			
Rock outcrop	0-60	---	---	---	0.00-0.00	---	---	---	---	-	8	0
44:												
Happle	0-7	12-20	1.35-1.50	0.6-6	0.05-0.07	0.0-2.9	0.5-1.0	.10	.28	5	8	0
	7-14	12-20	1.35-1.50	0.6-6	0.05-0.07	0.0-2.9	0.0-0.5	.10	.32			
	14-32	20-30	1.25-1.40	0.6-2	0.07-0.09	0.0-2.9	0.0-0.5	.10	.24			
	32-60	10-20	1.35-1.50	0.6-6	0.03-0.04	0.0-2.9	0.0-0.5	.05	.32			
45:												
Happle	0-7	12-20	1.35-1.50	0.6-6	0.05-0.07	0.0-2.9	0.5-1.0	.10	.28	5	8	0
	7-14	12-20	1.35-1.50	0.6-6	0.05-0.07	0.0-2.9	0.0-0.5	.10	.32			
	14-32	20-30	1.25-1.40	0.6-2	0.07-0.09	0.0-2.9	0.0-0.5	.10	.24			
	32-60	10-20	1.35-1.50	0.6-6	0.03-0.04	0.0-2.9	0.0-0.5	.05	.32			
46:												
Happle	0-7	12-20	1.35-1.50	0.6-6	0.05-0.07	0.0-2.9	0.5-1.0	.10	.28	5	8	0
	7-14	12-20	1.35-1.50	0.6-6	0.05-0.07	0.0-2.9	0.0-0.5	.10	.32			
	14-32	20-30	1.25-1.40	0.6-2	0.07-0.09	0.0-2.9	0.0-0.5	.10	.24			
	32-60	10-20	1.35-1.50	0.6-6	0.03-0.04	0.0-2.9	0.0-0.5	.05	.32			
Rock outcrop	0-60	---	---	---	0.00-0.00	---	---	---	---	-	8	0
47:												
Hesperus	0-7	10-20	1.25-1.40	0.6-6	0.14-0.17	0.0-2.9	2.0-5.0	.20	.20	5	5	56
	7-60	20-35	1.25-1.40	0.2-0.6	0.17-0.20	3.0-5.9	1.0-2.0	.20	.20			
Empedrado	0-10	18-27	1.25-1.40	0.6-2	0.16-0.18	0.0-2.9	2.0-4.0	.24	.24	5	6	48
	10-21	27-35	1.25-1.40	0.6-2	0.17-0.21	3.0-5.9	0.5-1.0	.24	.24			
	21-28	20-30	1.25-1.40	0.6-2	0.10-0.13	0.0-2.9	0.5-1.0	.10	.20			
	28-60	18-27	1.25-1.40	0.6-2	0.14-0.18	0.0-2.9	0.0-0.5	.43	.43			
Pagoda	0-6	27-35	1.25-1.40	0.2-0.6	0.17-0.21	3.0-5.9	2.0-3.0	.20	.20	5	6	48
	6-17	27-35	1.25-1.40	0.2-0.6	0.17-0.21	3.0-5.9	1.0-3.0	.20	.20			
	17-27	35-50	1.15-1.40	0.06-0.2	0.14-0.21	6.0-8.9	0.5-1.0	.32	.20			
	27-60	30-50	1.15-1.40	0.06-0.6	0.14-0.21	3.0-5.9	0.0-0.5	.20	.20			
48:												
Hesperus	0-7	10-20	1.25-1.40	0.6-6	0.14-0.17	0.0-2.9	2.0-5.0	.20	.20	5	5	56
	7-60	20-35	1.25-1.40	0.2-0.6	0.17-0.20	3.0-5.9	1.0-2.0	.20	.20			
Empedrado	0-10	18-27	1.25-1.40	0.6-2	0.16-0.18	0.0-2.9	2.0-4.0	.24	.24	5	6	48
	10-21	27-35	1.25-1.40	0.6-2	0.17-0.21	3.0-5.9	0.5-1.0	.24	.24			
	21-28	20-30	1.25-1.40	0.6-2	0.10-0.13	0.0-2.9	0.5-1.0	.10	.20			
	28-60	18-27	1.25-1.40	0.6-2	0.14-0.18	0.0-2.9	0.0-0.5	.43	.43			
Pagoda	0-6	27-35	1.25-1.40	0.2-0.6	0.17-0.21	3.0-5.9	2.0-3.0	.20	.20	5	6	48
	6-17	27-35	1.25-1.40	0.2-0.6	0.17-0.21	3.0-5.9	1.0-3.0	.20	.20			
	17-27	35-50	1.15-1.40	0.06-0.2	0.14-0.21	6.0-8.9	0.5-1.0	.32	.20			
	27-60	30-50	1.15-1.40	0.06-0.6	0.14-0.21	3.0-5.9	0.0-0.5	.20	.20			

Table 15.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility (Ksat)	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors Kw	Kf	T	Wind erodi- bility group	Wind erodi- bility index
	In	Pct	g/cc	In/hr	In/in	Pct	Pct					
49:												
Hesperus	0-7	10-20	1.25-1.40	0.6-6	0.14-0.17	0.0-2.9	2.0-5.0	.20	.20	5	5	56
	7-60	20-35	1.25-1.40	0.2-0.6	0.17-0.20	3.0-5.9	1.0-2.0	.20	.20			
Pagoda	0-6	27-35	1.25-1.40	0.2-0.6	0.17-0.21	3.0-5.9	2.0-3.0	.20	.20	5	6	48
	6-17	27-35	1.25-1.40	0.2-0.6	0.17-0.21	3.0-5.9	1.0-3.0	.20	.20			
	17-27	35-50	1.15-1.40	0.06-0.2	0.14-0.21	6.0-8.9	0.5-1.0	.32	.20			
	27-60	30-50	1.15-1.40	0.06-0.6	0.14-0.21	3.0-5.9	0.0-0.5	.20	.20			
50:												
Irigul	0-6	18-27	1.25-1.40	0.6-2	0.10-0.13	0.0-2.9	1.0-3.0	.15	.28	1	6	48
	6-13	18-27	1.25-1.40	0.6-2	0.07-0.09	0.0-2.9	0.0-0.5	.15	.43			
	13-17	---	---	0.06-0.2	---	---	---	---	---			
Starman	0-1	15-23	1.25-1.40	0.6-6	0.10-0.13	0.0-2.9	1.0-2.0	.15	.28	1	4L	86
	1-11	20-27	1.25-1.40	0.6-2	0.04-0.09	0.0-2.9	0.5-1.0	.10	.37			
	11-15	---	---	0.06-0.2	---	---	---	---	---			
51:												
Mesa	0-3	15-20	1.35-1.50	0.6-6	0.14-0.17	0.0-2.9	0.5-1.0	.32	.32	3	3	86
	3-12	35-40	1.25-1.40	0.06-0.2	0.17-0.20	3.0-5.9	0.5-1.0	.24	.24			
	12-26	35-40	1.25-1.40	0.06-0.2	0.17-0.20	3.0-5.9	0.0-0.5	.28	.28			
	26-38	27-34	1.25-1.40	0.2-0.6	0.09-0.11	0.0-2.9	0.0-0.5	.10	.28			
	38-60	18-27	1.25-1.40	0.6-2	0.07-0.09	0.0-2.9	0.0-0.5	.15	.43			
Avalon	0-6	15-20	1.25-1.40	0.6-6	0.14-0.18	0.0-2.9	0.5-1.0	.37	.37	2	4L	86
	6-16	18-27	1.25-1.40	0.6-2	0.15-0.17	0.0-2.9	0.5-1.0	.43	.43			
	16-40	18-27	1.25-1.40	0.6-2	0.13-0.16	0.0-2.9	0.0-0.5	.43	.43			
	40-60	10-20	1.35-1.50	0.6-6	0.07-0.10	0.0-2.9	0.0-0.5	.17	.32			
52:												
Northwater	0-28	10-27	1.25-1.40	0.6-6	0.14-0.17	0.0-2.9	3.0-6.0	.20	.20	4	5	56
	28-48	20-27	1.25-1.40	0.6-2	0.07-0.09	0.0-2.9	1.0-3.0	.10	.28			
	48-60	20-27	1.25-1.40	0.6-2	0.07-0.09	0.0-2.9	0.5-1.0	.15	.37			
Adel	0-20	27-35	1.25-1.40	0.6-2	0.16-0.19	0.0-2.9	4.0-8.0	.15	.15	5	6	48
	20-31	18-30	1.25-1.40	0.6-2	0.16-0.19	0.0-2.9	1.0-5.0	.17	.17			
	31-60	18-30	1.25-1.40	0.6-2	0.16-0.19	0.0-2.9	0.0-2.0	.24	.24			
53:												
Pagoda	0-6	27-35	1.25-1.40	0.2-0.6	0.17-0.21	3.0-5.9	2.0-3.0	.20	.20	5	6	48
	6-17	27-35	1.25-1.40	0.2-0.6	0.17-0.21	3.0-5.9	1.0-3.0	.20	.20			
	17-27	35-50	1.15-1.40	0.06-0.2	0.14-0.21	6.0-8.9	0.5-1.0	.32	.20			
	27-60	30-50	1.15-1.40	0.06-0.6	0.14-0.21	3.0-5.9	0.0-0.5	.20	.20			
Hesperus	0-7	10-20	1.25-1.40	0.6-6	0.14-0.17	0.0-2.9	2.0-5.0	.20	.20	5	5	56
	7-60	20-35	1.25-1.40	0.2-0.6	0.17-0.20	3.0-5.9	1.0-2.0	.20	.20			
54:												
Panitchen	0-7	10-20	1.25-1.40	0.6-6	0.14-0.17	0.0-2.9	0.5-1.0	.37	.37	5	4L	86
	7-29	15-34	1.25-1.40	0.2-0.6	0.10-0.16	0.0-2.9	0.0-0.5	.24	.43			
	29-60	12-25	1.25-1.50	0.6-6	0.10-0.18	0.0-2.9	0.5-1.0	.28	.28			
55:												
Parachute	0-10	15-25	1.25-1.40	0.6-2	0.14-0.17	0.0-2.9	3.0-6.0	.20	.20	3	5	56
	10-25	18-25	1.25-1.40	0.6-2	0.07-0.09	0.0-2.9	1.0-2.0	.10	.28			
	25-29	---	---	0.06-0.2	---	---	---	---	---			
Irigul	0-6	18-27	1.25-1.40	0.6-2	0.10-0.13	0.0-2.9	1.0-3.0	.15	.28	1	6	48
	6-13	18-27	1.25-1.40	0.6-2	0.07-0.09	0.0-2.9	0.0-0.5	.15	.43			
	13-17	---	---	0.06-0.2	---	---	---	---	---			

Table 15.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea-bility (Ksat)	Available water capacity	Linear extensi-bility	Organic matter	Erosion factors Kw	Kf	T	Wind erodi-bility group	Wind erodi-bility index
	In	Pct	g/cc	In/hr	In/in	Pct	Pct					
56:												
Parachute-----------	0-10	15-25	1.25-1.40	0.6-2	0.14-0.17	0.0-2.9	3.0-6.0	.20	.20	3	5	56
	10-25	18-25	1.25-1.40	0.6-2	0.07-0.09	0.0-2.9	1.0-2.0	.10	.28			
	25-29	---	---	0.06-0.2	---	---	---	---	---			
Irigul--------------	0-6	18-27	1.25-1.40	0.6-2	0.10-0.13	0.0-2.9	1.0-3.0	.15	.28	1	6	48
	6-13	18-27	1.25-1.40	0.6-2	0.07-0.09	0.0-2.9	0.0-0.5	.15	.43			
	13-17	---	---	0.06-0.2	---	---	---	---	---			
Rhone---------------	0-10	20-27	1.25-1.40	0.6-2	0.14-0.17	0.0-2.9	3.0-6.0	.20	.20	4	6	48
	10-39	20-27	1.25-1.40	0.6-2	0.14-0.17	0.0-2.9	1.0-3.0	.15	.28			
	39-55	20-27	1.25-1.40	0.6-2	0.07-0.09	0.0-2.9	0.0-1.0	.15	.37			
	55-59	---	---	0.06-0.2	---	---	---	---	---			
57:												
Parachute-----------	0-10	15-25	1.25-1.40	0.6-2	0.14-0.17	0.0-2.9	3.0-6.0	.20	.20	3	5	56
	10-25	18-25	1.25-1.40	0.6-2	0.07-0.09	0.0-2.9	1.0-2.0	.10	.28			
	25-29	---	---	0.06-0.2	---	---	---	---	---			
Rhone---------------	0-10	20-27	1.25-1.40	0.6-2	0.14-0.17	0.0-2.9	3.0-6.0	.20	.20	4	6	48
	10-39	20-27	1.25-1.40	0.6-2	0.14-0.17	0.0-2.9	1.0-3.0	.15	.28			
	39-55	20-27	1.25-1.40	0.6-2	0.07-0.09	0.0-2.9	0.0-1.0	.15	.37			
	55-59	---	---	0.06-0.2	---	---	---	---	---			
58:												
Peninsula-----------	0-4	18-27	1.25-1.35	0.6-2	0.13-0.16	0.0-2.9	2.0-4.0	.24	.24	5	6	48
	4-19	27-34	1.25-1.35	0.2-0.6	0.16-0.19	3.0-5.9	1.0-2.0	.20	.20			
	19-28	35-40	1.15-1.30	0.2-0.6	0.16-0.19	3.0-5.9	0.5-1.0	.28	.28			
	28-60	20-27	1.25-1.40	0.6-2	0.13-0.16	0.0-2.9	0.0-0.5	.43	.43			
59:												
Persayo-------------	0-3	20-35	1.15-1.30	0.2-0.6	0.15-0.18	3.0-5.9	0.5-1.0	.32	.32	2	4L	86
	3-15	20-35	1.15-1.30	0.2-0.6	0.15-0.18	3.0-5.9	0.0-0.5	.37	.37			
	15-19	---	---	0.06-0.2	---	---	---	---	---			
60:												
Redcreek------------	0-4	5-15	1.35-1.50	2-6	0.10-0.13	0.0-2.9	0.5-1.0	.28	.28	1	3	86
	4-11	5-15	1.35-1.50	2-6	0.10-0.13	0.0-2.9	0.0-0.5	.32	.32			
	11-16	5-15	1.35-1.50	2-6	0.07-0.10	0.0-2.9	0.0-0.5	.17	.32			
	16-20	---	---	0.06-0.2	---	---	---	---	---			
Rentsac-------------	0-6	7-18	1.25-1.40	2-6	0.10-0.13	0.0-2.9	0.5-1.0	.20	.37	1	4L	86
	6-19	7-18	1.25-1.40	2-6	0.07-0.09	0.0-2.9	0.0-0.5	.15	.43			
	19-22	---	---	0.06-0.2	---	---	---	---	---			
61:												
Rock outcrop--------	0-60	---	---	---	0.00-0.00	---	---	---	---	-	8	0
Torriorthents-------	0-2	20-25	1.25-1.40	0.6-2	0.10-0.13	0.0-2.9	0.5-1.0	.20	.37	1	4L	86
	2-13	15-25	1.25-1.35	0.6-6	0.05-0.07	0.0-2.9	0.0-0.5	.15	.43			
	13-17	---	---	0.06-2	---	---	---	---	---			
62:												
Shawa---------------	0-20	20-27	1.25-1.40	0.6-2	0.14-0.17	0.0-2.9	2.0-4.0	.24	.24	5	6	48
	20-32	18-27	1.25-1.40	0.6-2	0.14-0.17	0.0-2.9	1.0-2.0	.28	.28			
	32-60	18-27	1.25-1.40	0.6-2	0.14-0.17	0.0-2.9	0.5-1.0	.37	.37			
63:												
Silas---------------	0-18	20-27	1.25-1.40	0.6-2	0.16-0.18	0.0-2.9	2.0-6.0	.20	.20	5	6	48
	18-60	27-35	1.25-1.40	0.2-0.6	0.16-0.20	0.0-2.9	1.0-4.0	.20	.20			

Table 15.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility (Ksat)	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors Kw	Kf	T	Wind erodi- bility group	Wind erodi- bility index
	In	Pct	g/cc	In/hr	In/in	Pct	Pct					
64:												
Torrifluvents-------	0-6	15-25	1.25-1.40	0.6-6	0.14-0.17	0.0-2.9	0.5-1.0	.37	.37	5	4L	86
	6-60	7-30	1.15-1.50	0.2-6	0.10-0.21	0.0-2.9	0.0-0.5	.32	.37			
Gullied land--------	0-60	---	---	---	0.00-0.00	---	---	---	---	-	8	0
65:												
Torriorthents-------	0-2	20-25	1.25-1.40	0.6-6	0.10-0.13	0.0-2.9	0.5-1.0	.20	.37	1	4L	86
	2-13	15-25	1.25-1.35	0.6-6	0.05-0.07	0.0-2.9	0.0-0.5	.15	.43			
	13-17	---	---	0.06-2	---	---	---	---	---			
Rock outcrop--------	0-60	---	---	---	0.00-0.00	---	---	---	---	-	8	0
66:												
Torriorthents-------	0-2	20-25	1.25-1.40	0.6-6	0.10-0.13	0.0-2.9	0.5-1.0	.20	.37	1	4L	86
	2-13	15-25	1.25-1.35	0.6-6	0.05-0.07	0.0-2.9	0.0-0.5	.15	.43			
	13-17	---	---	0.06-2	---	---	---	---	---			
Rock outcrop--------	0-60	---	---	---	0.00-0.00	---	---	---	---	-	8	0
67:												
Tosca---------------	0-8	12-18	1.25-1.40	2-6	0.10-0.13	0.0-2.9	1.0-3.0	.15	.28	2	4L	86
	8-46	12-18	1.25-1.40	0.6-2	0.07-0.09	0.0-2.9	0.5-1.0	.15	.37			
	46-60	12-18	1.25-1.40	2-6	0.07-0.09	0.0-2.9	0.0-0.5	.15	.43			
68:												
Trail---------------	0-5	3-10	1.45-1.60	6-20	0.06-0.08	0.0-2.9	0.5-1.0	.20	.20	5	2	134
	5-60	3-15	1.35-1.60	6-20	0.06-0.13	0.0-2.9	0.0-0.5	.24	.24			
69:												
Travessilla---------	0-2	15-20	1.35-1.50	2-6	0.13-0.16	0.0-2.9	0.5-1.0	.28	.28	1	3	86
	2-9	15-20	1.35-1.50	2-6	0.13-0.16	0.0-2.9	0.0-0.5	.32	.32			
	9-13	---	---	0.06-0.2	---	---	---	---	---			
Rock outcrop--------	0-60	---	---	---	0.00-0.00	---	---	---	---	-	8	0
70:												
Uffens--------------	0-5	12-18	1.25-1.40	2-6	0.13-0.16	0.0-2.9	0.5-1.0	.37	.37	5	4L	86
	5-20	18-27	1.25-1.40	0.2-0.6	0.13-0.16	0.0-2.9	0.5-1.0	.37	.37			
	20-27	18-27	1.25-1.40	0.2-0.6	0.10-0.13	0.0-2.9	0.0-0.5	.43	.43			
	27-60	12-18	1.35-1.50	0.6-2	0.07-0.09	0.0-2.9	0.0-0.5	.32	.32			
71:												
Utso----------------	0-4	18-27	1.25-1.40	0.6-2	0.10-0.13	0.0-2.9	2.0-3.0	.15	.28	5	6	48
	4-11	18-27	1.25-1.40	0.6-2	0.07-0.09	0.0-2.9	1.0-2.0	.10	.28			
	11-60	18-27	1.25-1.40	0.6-2	0.07-0.09	0.0-2.9	0.5-1.0	.15	.37			
Rock outcrop--------	0-60	---	---	---	0.00-0.00	---	---	---	---	-	8	0
72:												
Wesdy---------------	0-15	15-25	1.25-1.40	0.6-6	0.11-0.14	0.0-2.9	2.0-3.0	.15	.28	5	5	56
	15-39	35-50	1.15-1.40	0.06-0.2	0.08-0.11	3.0-5.9	0.5-1.0	.10	.24			
	39-60	35-50	1.15-1.40	0.06-0.2	0.08-0.11	3.0-5.9	0.0-0.5	.10	.24			
73:												
Wesdy---------------	0-15	15-25	1.25-1.40	0.6-6	0.11-0.14	0.0-2.9	2.0-3.0	.15	.28	5	5	56
	15-39	35-50	1.15-1.40	0.06-0.2	0.08-0.11	3.0-5.9	0.5-1.0	.10	.24			
	39-60	35-50	1.15-1.40	0.06-0.2	0.08-0.11	3.0-5.9	0.0-0.5	.10	.24			
Northwater----------	0-28	10-27	1.25-1.40	0.6-6	0.14-0.17	0.0-2.9	3.0-6.0	.20	.20	4	5	56
	28-48	20-27	1.25-1.40	0.6-2	0.07-0.09	0.0-2.9	1.0-3.0	.10	.28			
	48-60	20-27	1.25-1.40	0.6-2	0.07-0.09	0.0-2.9	0.5-1.0	.15	.37			

Table 15.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea-bility (Ksat)	Available water capacity	Linear extensi-bility	Organic matter	Erosion factors Kw	Erosion factors Kf	Erosion factors T	Wind erodi-bility group	Wind erodi-bility index
	In	Pct	g/cc	In/hr	In/in	Pct	Pct					
74:												
Winnemucca----------	0-19	20-27	1.25-1.40	0.6-2	0.14-0.17	0.0-2.9	2.0-5.0	.20	.20	5	6	48
	19-28	27-38	1.25-1.40	0.2-0.6	0.13-0.16	0.0-2.9	1.0-2.0	.10	.20			
	28-36	30-38	1.25-1.40	0.06-0.6	0.09-0.11	0.0-2.9	0.5-1.0	.10	.24			
	36-50	40-50	1.15-1.30	0.06-0.2	0.07-0.08	3.0-5.9	0.5-1.0	.05	.17			
	50-60	40-50	1.15-1.30	0.06-0.2	0.14-0.17	3.0-5.9	0.0-0.5	.17	.17			
Castino-------------	0-16	20-27	1.25-1.30	0.6-2	0.14-0.17	0.0-2.9	4.0-8.0	.20	.20	2	6	48
	16-21	35-40	1.25-1.40	0.2-0.6	0.13-0.16	3.0-5.9	1.0-3.0	.10	.20			
	21-29	35-45	1.25-1.40	0.2-0.6	0.09-0.11	3.0-5.9	1.0-2.0	.05	.20			
	29-38	40-45	1.15-1.30	0.06-0.2	0.07-0.08	6.0-8.9	0.5-1.0	.05	.17			
	38-42	---	---	0.06-0.2	---	---	---	---	---			
75:												
Wrayha--------------	0-4	15-20	1.35-1.50	0.6-6	0.07-0.10	0.0-2.9	1.0-2.0	.15	.24	5	3	86
	4-28	35-40	1.25-1.40	0.06-0.2	0.17-0.21	3.0-5.9	0.0-0.5	.28	.28			
	28-60	35-50	1.15-1.30	0.06-0.2	0.14-0.21	6.0-8.9	0.0-0.5	.37	.37			
Rabbitex------------	0-7	15-27	1.25-1.40	0.6-6	0.13-0.16	0.0-2.9	2.0-3.0	.24	.24	5	4L	86
	7-15	18-27	1.25-1.40	0.6-2	0.13-0.16	0.0-2.9	1.0-2.0	.28	.28			
	15-60	18-27	1.30-1.35	0.6-2	0.10-0.13	0.0-2.9	0.5-1.0	.20	.37			
Veatch--------------	0-6	10-20	1.25-1.40	0.6-6	0.14-0.17	0.0-2.9	1.0-3.0	.28	.28	2	5	56
	6-11	10-20	1.25-1.40	0.6-6	0.14-0.17	0.0-2.9	0.5-1.0	.37	.37			
	11-32	15-20	1.35-1.50	0.6-2	0.05-0.07	0.0-2.9	0.0-0.5	.10	.32			
	32-36	---	---	0.06-0.2	---	---	---	---	---			
76:												
Wrayha--------------	0-4	15-20	1.35-1.50	0.6-6	0.07-0.10	0.0-2.9	1.0-2.0	.15	.24	5	3	86
	4-28	35-40	1.25-1.40	0.06-0.2	0.17-0.21	3.0-5.9	0.0-0.5	.28	.28			
	28-60	35-50	1.15-1.30	0.06-0.2	0.14-0.21	6.0-8.9	0.0-0.5	.37	.37			
Veatch--------------	0-6	10-20	1.25-1.40	0.6-6	0.14-0.17	0.0-2.9	1.0-3.0	.28	.28	2	5	56
	6-11	10-20	1.25-1.40	0.6-6	0.14-0.17	0.0-2.9	0.5-1.0	.37	.37			
	11-32	15-20	1.35-1.50	0.6-2	0.05-0.07	0.0-2.9	0.0-0.5	.10	.32			
	32-36	---	---	0.06-0.2	---	---	---	---	---			
Rabbitex------------	0-7	15-27	1.25-1.40	0.6-6	0.13-0.16	0.0-2.9	2.0-3.0	.24	.24	5	4L	86
	7-15	18-27	1.25-1.40	0.6-2	0.13-0.16	0.0-2.9	1.0-2.0	.28	.28			
	15-60	18-27	1.30-1.35	0.6-2	0.10-0.13	0.0-2.9	0.5-1.0	.20	.37			
77:												
Yamo----------------	0-5	20-25	1.25-1.40	0.6-2	0.14-0.17	0.0-2.9	0.5-1.0	.20	.20	5	5	56
	5-16	20-30	1.25-1.40	0.6-2	0.14-0.17	0.0-2.9	0.5-1.0	.20	.20			
	16-40	20-30	1.25-1.45	0.6-2	0.14-0.17	0.0-2.9	0.0-0.5	.24	.24			
	40-60	15-20	1.35-1.50	0.6-6	0.10-0.13	0.0-2.9	0.0-0.5	.32	.32			
Redcreek------------	0-4	5-15	1.35-1.50	2-6	0.10-0.13	0.0-2.9	0.5-1.0	.28	.28	1	3	86
	4-11	5-15	1.35-1.50	2-6	0.10-0.13	0.0-2.9	0.0-0.5	.32	.32			
	11-16	5-15	1.35-1.50	2-6	0.07-0.10	0.0-2.9	0.0-0.5	.17	.32			
	16-20	---	---	0.06-0.2	---	---	---	---	---			
78:												
Youngston-----------	0-4	15-25	1.25-1.40	0.6-2	0.14-0.18	0.0-2.9	0.5-1.0	.37	.37	5	4L	86
	4-60	18-27	1.25-1.50	0.2-0.6	0.14-0.18	0.0-2.9	0.5-1.0	.37	.37			
79:												
Water.												

Table 16.--Chemical Properties of the Soils

(Absence of an entry indicates that data were not estimated.)

Map symbol and soil name	Depth	Cation-exchange capacity	Soil reaction	Calcium carbon-ate	Gypsum	Salinity	Sodium adsorp-tion ratio
	In	meq/100g	pH	Pct	Pct	mmhos/cm	
1:							
Aga	0-3	5.0-10	7.9-8.4	5-10	0	0.0-2.0	0
	3-28	4.0-10	7.9-8.4	5-10	0	0.0-2.0	0
	28-60	0.0-5.0	7.9-8.4	5-10	0	0.0-2.0	0
2:							
Badland.							
3:							
Barx	0-3	10-20	6.6-7.8	0-5	0	0.0-2.0	0
	3-14	10-20	7.4-8.4	0-10	0	0.0-2.0	0
	14-40	5.0-15	7.9-9.0	15-25	0	2.0-4.0	0-5
	40-60	5.0-15	7.9-9.0	5-10	0	2.0-4.0	0-5
4:							
Barx	0-3	10-20	6.6-7.8	0-5	0	0.0-2.0	0
	3-14	10-20	7.4-8.4	0-10	0	0.0-2.0	0
	14-40	5.0-15	7.9-9.0	15-25	0	2.0-4.0	0-5
	40-60	5.0-15	7.9-9.0	5-10	0	2.0-4.0	0-5
Clapper	0-3	10-20	7.9-9.0	5-10	0	0.0-4.0	0-5
	3-12	5.0-20	7.9-9.0	5-10	0	0.0-4.0	0-5
	12-26	5.0-15	7.9-9.0	15-40	0	0.0-4.0	0-5
	26-60	5.0-15	7.9-9.0	10-15	0	0.0-4.0	0-5
5:							
Battlement	0-6	10-20	7.4-8.4	2-5	0	0	0
	6-45	15-20	7.4-8.4	3-10	0	0.0-4.0	0
	45-60	10-15	7.4-8.4	3-10	0-2	0.0-4.0	0
6:							
Battlement	0-6	10-20	7.4-8.4	5-10	0	0.0-2.0	0
	6-15	5.0-15	7.4-8.4	5-10	0	4.0-8.0	0
	15-60	5.0-20	7.4-8.4	5-10	0	4.0-8.0	0
7:							
Biedsaw	0-4	10-20	7.4-8.4	5-10	0	2.0-4.0	0
	4-9	10-20	7.4-8.4	5-10	0	2.0-4.0	0
	9-43	10-20	7.4-8.4	5-10	0	2.0-4.0	0
	43-60	20-35	7.4-9.0	5-10	0	2.0-4.0	0-5
Sunup	0-4	5.0-20	7.4-7.8	5-10	0	2.0-4.0	0
	4-11	5.0-20	7.9-9.0	5-10	0	2.0-4.0	0-5
	11-15	---	---	---	---	---	---
8:							
Billings	0-7	10-20	7.4-9.0	15-25	0-2	2.0-8.0	0-10
	7-43	10-20	7.4-9.0	15-25	2-10	2.0-8.0	0-10
	43-60	5.0-15	7.4-9.0	15-25	2-10	2.0-8.0	0-10
9:							
Bookcliff	0-2	10-25	6.6-7.8	0	0	0	0
	2-18	10-20	6.6-7.8	1-10	0	0	0
	18-36	5.0-15	7.4-8.4	10-20	0	2.0-4.0	0
	36-42	5.0-15	7.4-8.4	25-40	0	2.0-4.0	0
	42-60	5.0-15	7.4-8.4	20-30	0	2.0-4.0	0

Table 16.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	In	meq/100g	pH	Pct	Pct	mmhos/cm	
9:							
Utso	0-4	10-20	6.6-7.8	0	0	0	0
	4-11	10-20	6.6-7.8	0	0	0	0
	11-44	5.0-20	7.4-7.8	1-10	0	0	0
	44-48	---	---	---	---	---	---
10:							
Borollic Calciorthids	0-4	10-15	6.6-7.8	0-5	0	0.0-4.0	0
	4-11	10-20	7.4-8.4	5-15	0	0.0-4.0	0
	11-60	4.0-15	7.9-8.4	15-60	0	4.0-8.0	0
11:							
Borpark	0-2	10-20	7.4-7.8	0-5	0	0.0-2.0	0
	2-8	10-20	7.4-8.4	5-15	0	0.0-2.0	0
	8-41	10-20	7.4-8.4	5-15	0	0.0-2.0	0
	41-60	5.0-15	7.9-9.0	15-35	0	0.0-4.0	0-5
	60-66	4.0-10	7.9-9.0	5-10	0	0.0-4.0	0-5
12:							
Bunkwater	0-2	5.0-15	7.9-8.4	0	0	0.0-2.0	0-10
	2-13	10-25	8.5-11.0	0-5	0	4.0-8.0	15-25
	13-33	10-20	9.1-11.0	5-15	0	4.0-8.0	15-75
	33-60	10-30	8.5-11.0	5-15	0-1	4.0-8.0	15-75
13:							
Caballo	0-6	10-25	6.6-7.8	0	0	0.0-2.0	0
	6-18	10-20	6.6-8.4	1-2	0	0.0-2.0	0
	18-44	5.0-20	6.6-8.4	2-10	0	0.0-2.0	0
	44-48	---	---	---	---	---	---
14:							
Callings	0-11	15-30	6.1-6.5	0	0	0	0
	11-15	10-15	6.6-7.3	0	0	0	0
	15-46	25-40	6.6-7.3	0	0	0	0
	46-60	25-40	6.6-7.3	0	0	0	0
15:							
Cameo	0-4	4.0-10	7.4-8.4	1-10	0	0.0-2.0	0
	4-60	2.0-10	7.9-8.4	5-15	0	0.0-4.0	0
16:							
Castino	0-16	20-40	6.1-7.3	0	0	0	0
	16-21	20-35	6.6-7.3	0	0	0	0
	21-29	20-30	6.6-7.3	0	0	0	0
	29-38	25-40	6.6-7.3	0	0	0	0
	38-42	---	---	---	---	---	---
Skisams	0-15	10-25	6.6-7.8	0	0	0.0-2.0	0
	15-19	5.0-20	6.6-7.8	0	0	0.0-2.0	0
	19-23	---	---	---	---	---	---
Winnemucca	0-19	15-30	6.1-6.5	0	0	0	0
	19-28	20-30	6.6-7.3	0	0	0	0
	28-36	20-30	6.6-7.3	0	0	0	0
	36-50	25-40	6.6-7.3	0	0	0	0
	50-60	25-40	6.6-7.3	0	0	0	0

Table 16.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Soil reaction	Calcium carbon-ate	Gypsum	Salinity	Sodium adsorp-tion ratio
	In	meq/100g	pH	Pct	Pct	mmhos/cm	
17:							
Cathedral------------	0-5	4.0-15	6.1-7.8	0	0	0	0
	5-11	5.0-15	6.1-7.3	0	0	0	0
	11-15	---	---	---	---	---	---
Veatch---------------	0-6	5.0-20	6.6-7.3	0	0	0	0
	6-11	5.0-15	7.4-7.8	0	0	0	0
	11-32	5.0-10	7.9-8.4	5-15	0	0.0-2.0	0
	32-36	---	---	---	---	---	---
18:							
Cerro----------------	0-7	20-30	6.6-7.3	0	0	0	0
	7-12	15-35	7.4-7.8	0	0	0	0
	12-35	25-45	7.9-8.4	0-2	0	0.0-2.0	0
	35-60	15-30	7.9-8.4	5-15	0	0.0-2.0	0
19:							
Cerro----------------	0-7	20-30	6.6-7.3	0	0	0	0
	7-12	15-35	7.4-7.8	0	0	0	0
	12-35	25-45	7.9-8.4	0-2	0	0.0-2.0	0
	35-60	15-30	7.9-8.4	5-15	0	0.0-2.0	0
20:							
Cerro----------------	0-7	20-30	6.6-7.3	0	0	0	0
	7-12	15-35	7.4-7.8	0	0	0	0
	12-35	25-45	7.9-8.4	0-2	0	0.0-2.0	0
	35-60	15-30	7.9-8.4	5-15	0	0.0-2.0	0
21:							
Chipeta--------------	0-4	10-25	7.4-8.4	5-10	1-2	8.0-16.0	0
	4-13	15-25	7.4-8.4	5-10	1-2	8.0-16.0	0
	13-17	---	---	---	---	---	---
22:							
Clapper--------------	0-3	10-20	7.9-9.0	5-10	0	0.0-4.0	0-5
	3-12	5.0-20	7.9-9.0	5-10	0	0.0-4.0	0-5
	12-26	5.0-15	7.9-9.0	15-40	0	0.0-4.0	0-5
	26-60	5.0-15	7.9-9.0	10-15	0	0.0-4.0	0-5
23:							
Clapper--------------	0-3	10-20	7.9-9.0	5-10	0	0.0-4.0	0-5
	3-12	5.0-20	7.9-9.0	5-10	0	0.0-4.0	0-5
	12-26	5.0-15	7.9-9.0	15-40	0	0.0-4.0	0-5
	26-60	5.0-15	7.9-9.0	10-15	0	0.0-4.0	0-5
24:							
Cochetopa------------	0-20	20-40	6.6-7.3	0	0	0	0
	20-33	20-35	6.6-7.8	0	0	0	0
	33-45	25-45	6.6-7.8	0	0	0	0
	45-60	15-30	6.6-7.8	0	0	0	0
Clayburn-------------	0-13	10-25	6.1-7.3	0	0	0	0
	13-46	15-25	6.1-7.3	0	0	0	0
	46-60	5.0-15	6.1-7.3	0	0	0	0
25:							
Cowestglen-----------	0-6	3.0-10	7.9-9.0	1-5	0	0.0-2.0	1-8
	6-60	3.0-15	7.9-9.0	3-10	0	2.0-4.0	1-8

Table 16.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Soil reaction	Calcium carbon-ate	Gypsum	Salinity	Sodium adsorp-tion ratio
	In	meq/100g	pH	Pct	Pct	mmhos/cm	
26:							
Cryochrepts----------	0-8	5.0-15	5.6-6.5	0	0	0	0
	8-16	5.0-15	5.6-6.5	0	0	0	0
	16-60	10-20	6.1-7.3	0	0	0	0
Cryoborolls----------	0-9	10-20	6.1-7.3	0	0	0	0
	9-28	10-25	6.1-7.3	0	0	0	0
	28-42	10-20	6.1-7.3	0	0	0	0
	42-60	10-20	6.1-7.3	0	0	0	0
Rubble land.							
27:							
Cryorthents----------	0-3	5.0-15	7.4-7.8	1-5	0	0.0-2.0	0
	3-25	5.0-10	7.4-8.4	5-10	0	2.0-4.0	0
	25-29	---	---	---	---	---	---
Rock outcrop.							
28:							
Cumulic Haploborolls-	0-8	10-25	6.6-8.4	0-5	0	0.0-4.0	0
	8-20	10-20	7.4-8.4	5-10	0	0.0-4.0	0
	20-28	10-25	7.4-8.4	5-10	0	0.0-4.0	0
	28-60	4.0-10	7.4-8.4	5-10	0	0.0-4.0	0
29:							
Debeque--------------	0-4	10-20	7.4-8.4	0-5	0	0.0-2.0	0
	4-7	5.0-15	7.4-8.4	5-10	0	0.0-2.0	0
	7-60	4.0-10	7.9-8.4	5-10	0	0.0-2.0	0
30:							
Debeque--------------	0-4	10-20	7.4-8.4	0-5	0	0.0-2.0	0
	4-7	5.0-15	7.4-8.4	5-10	0	0.0-2.0	0
	7-60	4.0-10	7.9-8.4	5-10	0	0.0-2.0	0
Hesperus-------------	0-7	10-20	6.6-7.3	0	0	0	0
	7-60	15-25	6.6-7.8	0	0	0	0
31:							
Dominguez------------	0-3	15-30	7.9-8.4	0-5	0	0.0-4.0	0
	3-60	20-40	7.9-9.0	5-15	0	0.0-4.0	0-5
32:							
Dominguez------------	0-3	15-30	7.9-8.4	0-5	0	0.0-4.0	0
	3-60	20-40	7.9-9.0	5-15	0	0.0-4.0	0-5
33:							
Emmons---------------	0-8	10-20	7.4-7.8	0-5	0	0	0
	8-13	10-20	7.4-7.8	0-5	0	0	0
	13-19	5.0-15	7.9-8.4	5-15	0	0.0-2.0	0
	19-60	5.0-15	8.5-9.0	15-30	0	0.0-2.0	0-5
Cerro----------------	0-7	20-30	6.6-7.3	0	0	0	0
	7-12	15-35	7.4-7.8	0	0	0	0
	12-35	25-45	7.9-8.4	0-2	0	0.0-2.0	0
	35-60	15-30	7.9-8.4	5-15	0	0.0-2.0	0

Table 16.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Soil reaction	Calcium carbon-ate	Gypsum	Salinity	Sodium adsorp-tion ratio
	In	meq/100g	pH	Pct	Pct	mmhos/cm	
33:							
Pagoda	0-6	15-25	6.6-7.8	0	0	0	0
	6-17	15-25	6.6-7.8	0	0	0	0
	17-27	15-30	6.6-7.8	0	0	0	0
	27-60	10-30	7.9-8.4	5-15	0	0.0-2.0	0
34:							
Empedrado	0-10	10-25	6.6-7.3	0	0	0	0
	10-21	10-25	6.6-7.3	0	0	0	0
	21-28	10-20	6.6-7.8	0	0	0	0
	28-60	5.0-15	7.9-8.4	5-10	0	0.0-2.0	0
35:							
Empedrado	0-10	10-25	6.6-7.3	0	0	0	0
	10-21	10-25	6.6-7.3	0	0	0	0
	21-28	10-20	6.6-7.8	0	0	0	0
	28-60	5.0-15	7.9-8.4	5-10	0	0.0-2.0	0
Pagoda	0-6	15-25	6.6-7.8	0	0	0	0
	6-17	15-25	6.6-7.8	0	0	0	0
	17-27	15-30	6.6-7.8	0	0	0	0
	27-60	10-30	7.9-8.4	5-15	0	0.0-2.0	0
Godding	0-7	15-25	6.6-7.3	0	0	0	0
	7-27	25-40	6.6-7.3	0	0	0	0
	27-60	15-30	6.6-7.3	0	0	0	0
36:							
Fluvaquents	0-13	5.0-20	7.4-9.0	5-10	0	0.0-4.0	0-5
	13-60	5.0-20	7.4-9.0	5-10	0	0.0-8.0	0-5
37:							
Fughes	0-7	20-35	6.6-7.8	0	0	0	0
	7-18	20-35	6.6-7.8	0	0	0	0
	18-50	20-30	6.6-7.8	0	0	0	0
	50-60	15-30	6.6-7.8	0	0	0	0
38:							
Fughes	0-7	20-35	6.6-7.8	0	0	0	0
	7-18	20-35	6.6-7.8	0	0	0	0
	18-50	20-30	6.6-7.8	0	0	0	0
	50-60	15-30	6.6-7.8	0	0	0	0
39:							
Fughes	0-7	20-35	6.6-7.8	0	0	0	0
	7-18	20-35	6.6-7.8	0	0	0	0
	18-50	20-30	6.6-7.8	0	0	0	0
	50-60	15-30	6.6-7.8	0	0	0	0
Hesperus	0-7	10-20	6.6-7.3	0	0	0	0
	7-60	15-25	6.6-7.8	0	0	0	0
40:							
Godding	0-7	15-25	6.6-7.3	0	0	0	0
	7-10	20-30	6.6-7.3	0	0	0	0
	10-27	25-40	6.6-7.3	0	0	0	0
	27-60	15-30	6.6-7.3	0	0	0	0

Table 16.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Soil reaction	Calcium carbon-ate	Gypsum	Salinity	Sodium adsorp-tion ratio
	In	meq/100g	pH	Pct	Pct	mmhos/cm	
41:							
Golime	0-10	15-25	6.6-7.8	0	0	0	0
	10-15	20-30	7.4-7.8	0	0	0	0
	15-22	20-30	7.4-7.8	0-1	0	0	0
	22-34	15-30	7.9-8.4	1-5	0	0	0
	34-45	10-25	7.9-8.4	5-10	0	0.0-2.0	0
	45-60	10-20	7.9-8.4	10-20	0	0.0-2.0	0
42:							
Grobutte	0-4	10-20	7.4-9.0	1-5	0	0.0-2.0	0-5
	4-60	5.0-15	7.4-9.0	5-15	0	0.0-2.0	0-5
43:							
Haploborolls	0-6	10-20	6.6-7.8	0	0	0	0
	6-11	10-20	6.6-7.8	0	0	0	0
	11-22	10-15	6.6-8.4	0-5	0	0	0
	22-32	5.0-15	7.4-8.4	5-10	0	0.0-2.0	0
	32-36	---	---	---	---	---	---
Rock outcrop.							
44:							
Happle	0-7	5.0-15	7.4-8.4	5-10	0	0.0-2.0	0
	7-14	4.0-10	7.4-8.4	5-10	0	0.0-2.0	0
	14-32	5.0-20	7.4-8.4	5-10	0	0.0-2.0	0
	32-60	4.0-10	7.4-8.4	5-10	0	0.0-2.0	0
45:							
Happle	0-7	5.0-15	7.4-8.4	5-10	0	0.0-2.0	0
	7-14	4.0-10	7.4-8.4	5-10	0	0.0-2.0	0
	14-32	5.0-20	7.4-8.4	5-10	0	0.0-2.0	0
	32-60	4.0-10	7.4-8.4	5-10	0	0.0-2.0	0
46:							
Happle	0-7	5.0-15	7.4-8.4	5-10	0	0.0-2.0	0
	7-14	4.0-10	7.4-8.4	5-10	0	0.0-2.0	0
	14-32	5.0-20	7.4-8.4	5-10	0	0.0-2.0	0
	32-60	4.0-10	7.4-8.4	5-10	0	0.0-2.0	0
Rock outcrop.							
47:							
Hesperus	0-7	10-20	6.6-7.3	0	0	0	0
	7-60	15-25	6.6-7.8	0	0	0	0
Empedrado	0-10	10-25	6.6-7.3	0	0	0	0
	10-21	10-25	6.6-7.3	0	0	0	0
	21-28	10-20	6.6-7.8	0	0	0	0
	28-60	5.0-15	7.9-8.4	5-10	0	0.0-2.0	0
Pagoda	0-6	15-25	6.6-7.8	0	0	0	0
	6-17	15-25	6.6-7.8	0	0	0	0
	17-27	15-30	6.6-7.8	0	0	0	0
	27-60	10-30	7.9-8.4	5-15	0	0.0-2.0	0
48:							
Hesperus	0-7	10-20	6.6-7.3	0	0	0	0
	7-60	15-25	6.6-7.8	0	0	0	0

Table 16.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Soil reaction	Calcium carbon-ate	Gypsum	Salinity	Sodium adsorp-tion ratio
	In	meq/100g	pH	Pct	Pct	mmhos/cm	
48:							
Empedrado	0-10	10-25	6.6-7.3	0	0	0	0
	10-21	10-25	6.6-7.3	0	0	0	0
	21-28	10-20	6.6-7.8	0	0	0	0
	28-60	5.0-15	7.9-8.4	5-10	0	0.0-2.0	0
Pagoda	0-6	15-25	6.6-7.8	0	0	0	0
	6-17	15-25	6.6-7.8	0	0	0	0
	17-27	15-30	6.6-7.8	0	0	0	0
	27-60	10-30	7.9-8.4	5-15	0	0.0-2.0	0
49:							
Hesperus	0-7	10-20	6.6-7.3	0	0	0	0
	7-60	15-25	6.6-7.8	0	0	0	0
Pagoda	0-6	15-25	6.6-7.8	0	0	0	0
	6-17	15-25	6.6-7.8	0	0	0	0
	17-27	15-30	6.6-7.8	0	0	0	0
	27-60	10-30	7.9-8.4	5-15	0	0.0-2.0	0
50:							
Irigul	0-6	10-20	6.6-7.8	0	0	0	0
	6-13	5.0-15	6.6-7.8	0	0	0	0
	13-17	---	---	---	---	---	---
Starman	0-1	10-20	7.4-8.4	0-5	0	0.0-2.0	0
	1-11	10-20	7.9-9.0	5-10	0	0.0-2.0	0-5
	11-15	---	---	---	---	---	---
51:							
Mesa	0-3	5.0-15	7.4-7.8	0-5	0	0	0
	3-12	15-25	7.9-8.4	0-5	0	0	0
	12-26	10-25	7.9-8.4	5-20	0	0.0-2.0	0
	26-38	5.0-20	7.9-8.4	15-40	0-1	0.0-8.0	0
	38-60	4.0-15	7.9-8.4	15-40	0-1	4.0-16.0	0
Avalon	0-6	5.0-15	7.9-8.4	5-10	0	2.0-8.0	0
	6-16	5.0-15	7.9-8.4	5-15	0	2.0-8.0	0
	16-40	4.0-15	7.9-8.4	15-40	0	2.0-8.0	0
	40-60	2.0-10	7.9-8.4	5-30	0	2.0-8.0	0
52:							
Northwater	0-28	10-30	6.6-7.3	0	0	0	0
	28-48	10-20	6.6-7.3	0	0	0	0
	48-60	10-20	6.6-7.3	0	0	0	0
Adel	0-20	20-35	6.1-7.3	0	0	0	0
	20-31	15-30	6.1-7.3	0	0	0	0
	31-60	10-25	6.1-7.3	0-5	0	0	0
53:							
Pagoda	0-6	15-25	6.6-7.8	0	0	0	0
	6-17	15-25	6.6-7.8	0	0	0	0
	17-27	15-30	6.6-7.8	0	0	0	0
	27-60	10-30	7.9-8.4	5-15	0	0.0-2.0	0
Hesperus	0-7	10-20	6.6-7.3	0	0	0	0
	7-60	15-25	6.6-7.8	0	0	0	0

Table 16.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Soil reaction	Calcium carbon-ate	Gypsum	Salinity	Sodium adsorp-tion ratio
	In	meq/100g	pH	Pct	Pct	mmhos/cm	
54:							
Panitchen------------	0-7	5.0-15	7.9-8.4	1-10	0	0.0-2.0	0
	7-29	5.0-20	7.9-9.0	5-15	0	4.0-8.0	0-5
	29-60	5.0-15	7.9-9.0	5-15	0	4.0-8.0	0-5
55:							
Parachute------------	0-10	10-25	6.6-7.3	0	0	0	0
	10-25	10-20	6.6-7.3	0	0	0	0
	25-29	---	---	---	---	---	---
Irigul---------------	0-6	10-20	6.6-7.8	0	0	0	0
	6-13	5.0-15	6.6-7.8	0	0	0	0
	13-17	---	---	---	---	---	---
56:							
Parachute------------	0-10	10-25	6.6-7.3	0	0	0	0
	10-25	10-20	6.6-7.3	0	0	0	0
	25-29	---	---	---	---	---	---
Irigul---------------	0-6	10-20	6.6-7.8	0	0	0	0
	6-13	5.0-15	6.6-7.8	0	0	0	0
	13-17	---	---	---	---	---	---
Rhone----------------	0-10	15-30	6.6-7.3	0	0	0	0
	10-39	10-20	6.6-7.3	0	0	0	0
	39-55	10-20	6.6-7.3	0	0	0	0
	55-59	---	---	---	---	---	---
57:							
Parachute------------	0-10	10-25	6.6-7.3	0	0	0	0
	10-25	10-20	6.6-7.3	0	0	0	0
	25-29	---	---	---	---	---	---
Rhone----------------	0-10	15-30	6.6-7.3	0	0	0	0
	10-39	10-20	6.6-7.3	0	0	0	0
	39-55	10-20	6.6-7.3	0	0	0	0
	55-59	---	---	---	---	---	---
58:							
Peninsula------------	0-4	15-30	6.6-7.8	0	0	0	0
	4-19	20-30	6.6-7.8	0-1	0	0	0
	19-28	20-35	7.4-8.4	1-10	0	0.0-2.0	0
	28-60	10-20	7.9-9.0	5-35	0	0.0-2.0	0-5
59:							
Persayo--------------	0-3	10-20	7.4-8.4	5-15	0-1	0.0-8.0	0
	3-15	10-20	7.4-9.0	5-15	1-4	0.0-8.0	0-10
	15-19	---	---	---	---	---	---
60:							
Redcreek-------------	0-4	3.0-10	7.4-7.8	1-10	0	0	0
	4-11	2.0-10	7.9-8.4	1-10	0	0.0-2.0	0
	11-16	2.0-10	7.9-8.4	1-10	0	0.0-2.0	0
	16-20	---	---	---	---	---	---
Rentsac--------------	0-6	5.0-15	6.6-8.4	0-5	0	0	0
	6-19	3.0-10	7.4-8.4	5-15	0	0.0-4.0	0
	19-22	---	---	---	---	---	---

Table 16.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Soil reaction	Calcium carbon-ate	Gypsum	Salinity	Sodium adsorp-tion ratio
	In	meq/100g	pH	Pct	Pct	mmhos/cm	
61:							
Rock outcrop.							
Torriorthents--------	0-2	10-15	7.4-8.4	1-10	0	2.0-4.0	0
	2-13	5.0-15	7.4-8.4	5-15	0	4.0-8.0	0
	13-17	---	---	---	---	---	---
62:							
Shawa----------------	0-20	10-25	6.6-7.8	0	0	0	0
	20-32	10-20	7.4-7.8	0	0	0	0
	32-60	5.0-20	7.9-8.4	1-10	0	0.0-2.0	0
63:							
Silas----------------	0-18	10-30	6.6-7.8	0	0	0	0
	18-60	15-30	6.6-7.8	0	0	0	0
64:							
Torrifluvents--------	0-6	5.0-15	7.4-8.4	1-10	0-1	2.0-4.0	0
	6-60	5.0-20	7.4-8.4	5-15	0-2	4.0-8.0	0
Gullied land.							
65:							
Torriorthents--------	0-2	10-15	7.4-8.4	1-10	0	2.0-4.0	0
	2-13	5.0-15	7.4-8.4	5-15	0	4.0-8.0	0
	13-17	---	---	---	---	---	---
Rock outcrop.							
66:							
Torriorthents--------	0-2	10-15	7.4-8.4	1-10	0	2.0-4.0	0
	2-13	5.0-15	7.4-8.4	5-15	0	4.0-8.0	0
	13-17	---	---	---	---	---	---
Rock outcrop.							
67:							
Tosca----------------	0-8	5.0-15	7.4-8.4	1-10	0	0.0-2.0	0
	8-46	3.0-10	7.9-9.0	15-40	0	0.0-2.0	0-5
	46-60	4.0-10	7.9-9.0	15-20	0	0.0-2.0	0-5
68:							
Trail----------------	0-5	2.0-10	7.9-8.4	5-10	0	0.0-2.0	0
	5-60	0.0-10	7.9-8.4	5-15	0	0.0-2.0	0
69:							
Travessilla----------	0-2	5.0-15	7.4-7.8	1-5	0	0.0-2.0	0
	2-9	5.0-10	7.4-7.8	5-10	0	0.0-2.0	0
	9-13	---	---	---	---	---	---
Rock outcrop.							
70:							
Uffens---------------	0-5	5.0-10	7.4-8.4	5-10	0	0.0-4.0	1-10
	5-20	5.0-15	8.5-11.0	10-30	0	4.0-8.0	15-60
	20-27	5.0-15	8.5-11.0	15-30	0-1	8.0-16.0	15-45
	27-60	4.0-10	7.9-9.0	10-20	1-2	8.0-16.0	5-10

Table 16.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Soil reaction	Calcium carbon-ate	Gypsum	Salinity	Sodium adsorp-tion ratio
	In	meq/100g	pH	Pct	Pct	mmhos/cm	
71:							
Utso-----------------	0-4	10-20	6.6-7.8	0	0	0	0
	4-11	10-20	6.6-7.8	0	0	0	0
	11-60	5.0-20	7.4-8.4	1-10	0	0.0-2.0	0
Rock outcrop.							
72:							
Wesdy----------------	0-15	10-20	6.1-7.3	0	0	0	0
	15-39	15-30	6.1-7.3	0	0	0	0
	39-60	15-30	6.1-7.3	0	0	0	0
73:							
Wesdy----------------	0-15	10-20	6.1-7.3	0	0	0	0
	15-39	15-30	6.1-7.3	0	0	0	0
	39-60	15-30	6.1-7.3	0	0	0	0
Northwater-----------	0-28	10-30	6.6-7.3	0	0	0	0
	28-48	10-20	6.6-7.3	0	0	0	0
	48-60	10-20	6.6-7.3	0	0	0	0
74:							
Winnemucca-----------	0-19	15-30	6.1-6.5	0	0	0	0
	19-28	20-30	6.6-7.3	0	0	0	0
	28-36	20-30	6.6-7.3	0	0	0	0
	36-50	25-40	6.6-7.3	0	0	0	0
	50-60	25-40	6.6-7.3	0	0	0	0
Castino--------------	0-16	20-40	6.1-7.3	0	0	0	0
	16-21	20-35	6.6-7.3	0	0	0	0
	21-29	20-30	6.6-7.3	0	0	0	0
	29-38	25-40	6.6-7.3	0	0	0	0
	38-42	---	---	---	---	---	---
75:							
Wrayha---------------	0-4	5.0-15	7.9-8.4	5-10	0	0.0-2.0	0
	4-28	20-30	7.9-8.4	5-10	0	0.0-2.0	0
	28-60	20-40	7.9-8.4	5-10	0	0.0-2.0	0
Rabbitex-------------	0-7	10-20	7.4-8.4	5-15	0	0.0-2.0	0
	7-15	10-20	7.9-9.0	10-20	0	0.0-2.0	0-5
	15-60	5.0-15	7.9-9.0	15-30	0	0.0-2.0	0-5
Veatch---------------	0-6	5.0-20	6.6-7.3	0	0	0	0
	6-11	5.0-15	7.4-7.8	0	0	0	0
	11-32	5.0-10	7.9-8.4	5-15	0	0.0-2.0	0
	32-36	---	---	---	---	---	---
76:							
Wrayha---------------	0-4	5.0-15	7.9-8.4	5-10	0	0.0-2.0	0
	4-28	20-30	7.9-8.4	5-10	0	0.0-2.0	0
	28-60	20-40	7.9-8.4	5-10	0	0.0-2.0	0
Veatch---------------	0-6	5.0-20	6.6-7.3	0	0	0	0
	6-11	5.0-15	7.4-7.8	0	0	0	0
	11-32	5.0-10	7.9-8.4	5-15	0	0.0-2.0	0
	32-36	---	---	---	---	---	---
Rabbitex-------------	0-7	10-20	7.4-8.4	5-15	0	0.0-2.0	0
	7-15	10-20	7.9-9.0	10-20	0	0.0-2.0	0-5
	15-60	5.0-15	7.9-9.0	15-30	0	0.0-2.0	0-5

Table 16.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Soil reaction	Calcium carbon-ate	Gypsum	Salinity	Sodium adsorp-tion ratio
	In	meq/100g	pH	Pct	Pct	mmhos/cm	
77:							
Yamo-----------------	0-5	10-15	6.6-7.3	0	0	0	0
	5-16	10-20	7.4-7.8	1-10	0	0	0
	16-40	5.0-20	7.4-8.4	1-10	0	0.0-2.0	0
	40-60	5.0-15	7.4-8.4	1-10	0	0.0-2.0	0
Redcreek-------------	0-4	3.0-10	7.4-7.8	1-10	0	0	0
	4-11	2.0-10	7.9-8.4	1-10	0	0.0-2.0	0
	11-16	2.0-10	7.9-8.4	1-10	0	0.0-2.0	0
	16-20	---	---	---	---	---	---
78:							
Youngston------------	0-4	5.0-15	7.4-8.4	5-15	0	0.0-2.0	0
	4-60	5.0-20	7.9-9.0	5-15	0	2.0-8.0	0-10
79:							
Water.							

Table 17.--Water Features

(See text for definitions of terms used in this table. Estimates of the frequency of flooding apply to the whole year rather than to individual months. Absence of an entry indicates that the feature is not a concern or that data were not estimated.)

Map symbol and soil name	Hydro-logic group	Month	Water table: Upper limit	Water table: Lower limit	Flooding: Duration	Flooding: Frequency
			Ft	Ft		
1:						
Aga	C					
		April	3.0-6.0	>6.0	Brief	Occasional
		May	3.0-6.0	>6.0	Brief	Occasional
		June	3.0-6.0	>6.0	Brief	Occasional
2:						
Badland	D					
		Jan-Dec	---	---	---	None
3:						
Barx	B					
		Jan-Dec	---	---	---	None
4:						
Barx	B					
		Jan-Dec	---	---	---	None
Clapper	B					
		Jan-Dec	---	---	---	None
5:						
Battlement	B					
		March	---	---	Brief	Rare
		April	---	---	Brief	Rare
		May	---	---	Brief	Rare
		June	---	---	Brief	Rare
6:						
Battlement	B					
		March	---	---	Brief	Rare
		April	---	---	Brief	Rare
		May	---	---	Brief	Rare
		June	---	---	Brief	Rare
7:						
Biedsaw	C					
		Jan-Dec	---	---	---	None
Sunup	D					
		Jan-Dec	---	---	---	None
8:						
Billings	C					
		Jan-Dec	---	---	---	None
9:						
Bookcliff	B					
		Jan-Dec	---	---	---	None
Utso	B					
		Jan-Dec	---	---	---	None
10:						
Borollic Calciorthids	B					
		Jan-Dec	---	---	---	None

Table 17.--Water Features--Continued

Map symbol and soil name	Hydro-logic group	Month	Water table: Upper limit	Water table: Lower limit	Flooding: Duration	Flooding: Frequency
			Ft	Ft		
11:						
Borpark	B					
		Jan-Dec	---	---	---	None
12:						
Bunkwater	C					
		Jan-Dec	---	---	---	None
13:						
Caballo	B					
		Jan-Dec	---	---	---	None
14:						
Callings	C					
		Jan-Dec	---	---	---	None
15:						
Cameo	B					
		March	---	---	Brief	Rare
		April	---	---	Brief	Rare
		May	---	---	Brief	Rare
		June	---	---	Brief	Rare
16:						
Castino	C					
		Jan-Dec	---	---	---	None
Skisams	D					
		Jan-Dec	---	---	---	None
Winnemucca	C					
		Jan-Dec	---	---	---	None
17:						
Cathedral	D					
		Jan-Dec	---	---	---	None
Veatch	B					
		Jan-Dec	---	---	---	None
18:						
Cerro	C					
		Jan-Dec	---	---	---	None
19:						
Cerro	C					
		Jan-Dec	---	---	---	None
20:						
Cerro	C					
		Jan-Dec	---	---	---	None
21:						
Chipeta	D					
		Jan-Dec	---	---	---	None
22:						
Clapper	B					
		Jan-Dec	---	---	---	None

Table 17.--Water Features--Continued

Map symbol and soil name	Hydro-logic group	Month	Water table Upper limit	Water table Lower limit	Flooding Duration	Flooding Frequency
			Ft	Ft		
23:						
Clapper	B					
		Jan-Dec	---	---	---	None
24:						
Cochetopa	C					
		Jan-Dec	---	---	---	None
Clayburn	B					
		Jan-Dec	---	---	---	None
25:						
Cowestglen	B					
		March	---	---	Brief	Rare
		April	---	---	Brief	Rare
		May	---	---	Brief	Rare
		June	---	---	Brief	Rare
26:						
Cryochrepts	B					
		Jan-Dec	---	---	---	None
Cryoborolls	B					
		Jan-Dec	---	---	---	None
Rubble land	A					
		Jan-Dec	---	---	---	None
27:						
Cryorthents	C					
		Jan-Dec	---	---	---	None
Rock outcrop	D					
		Jan-Dec	---	---	---	None
28:						
Cumulic Haploborolls	B					
		May	3.0-6.0	>6.0	Brief	Occasional
		June	3.0-6.0	>6.0	Brief	Occasional
		July	3.0-6.0	>6.0	---	None
29:						
Debeque	B					
		Jan-Dec	---	---	---	None
30:						
Debeque	B					
		Jan-Dec	---	---	---	None
Hesperus	B					
		Jan-Dec	---	---	---	None
31:						
Dominguez	C					
		Jan-Dec	---	---	---	None
32:						
Dominguez	C					
		Jan-Dec	---	---	---	None

Table 17.--Water Features--Continued

Map symbol and soil name	Hydro-logic group	Month	Water table Upper limit	Water table Lower limit	Flooding Duration	Flooding Frequency
			Ft	Ft		
33:						
Emmons	B					
		Jan-Dec	---	---	---	None
Cerro	C					
		Jan-Dec	---	---	---	None
Pagoda	C					
		Jan-Dec	---	---	---	None
34:						
Empedrado	B					
		Jan-Dec	---	---	---	None
35:						
Empedrado	B					
		Jan-Dec	---	---	---	None
Pagoda	C					
		Jan-Dec	---	---	---	None
Godding	C					
		Jan-Dec	---	---	---	None
36:						
Fluvaquents	B/D					
		March	0.5-4.0	>6.0	---	None
		April	0.5-4.0	>6.0	---	None
		May	0.5-4.0	>6.0	Brief	Occasional
		June	0.5-4.0	>6.0	Brief	Occasional
		July	0.5-4.0	>6.0	---	None
		August	0.5-4.0	>6.0	---	None
		September	0.5-4.0	>6.0	---	None
37:						
Fughes	C					
		Jan-Dec	---	---	---	None
38:						
Fughes	C					
		Jan-Dec	---	---	---	None
39:						
Fughes	C					
		Jan-Dec	---	---	---	None
Hesperus	B					
		Jan-Dec	---	---	---	None
40:						
Godding	C					
		Jan-Dec	---	---	---	None
41:						
Golime	C					
		Jan-Dec	---	---	---	None
42:						
Grobutte	B					
		Jan-Dec	---	---	---	None

Table 17.--Water Features--Continued

Map symbol and soil name	Hydro-logic group	Month	Water table Upper limit	Water table Lower limit	Flooding Duration	Flooding Frequency
			Ft	Ft		
43:						
Haploborolls	C	Jan-Dec	---	---	---	None
Rock outcrop	D	Jan-Dec	---	---	---	None
44:						
Happle	B	Jan-Dec	---	---	---	None
45:						
Happle	B	Jan-Dec	---	---	---	None
46:						
Happle	B	Jan-Dec	---	---	---	None
Rock outcrop	D	Jan-Dec	---	---	---	None
47:						
Hesperus	B	Jan-Dec	---	---	---	None
Empedrado	B	Jan-Dec	---	---	---	None
Pagoda	C	Jan-Dec	---	---	---	None
48:						
Hesperus	B	Jan-Dec	---	---	---	None
Empedrado	B	Jan-Dec	---	---	---	None
Pagoda	C	Jan-Dec	---	---	---	None
49:						
Hesperus	B	Jan-Dec	---	---	---	None
Pagoda	C	Jan-Dec	---	---	---	None
50:						
Irigul	D	Jan-Dec	---	---	---	None
Starman	D	Jan-Dec	---	---	---	None
51:						
Mesa	B	Jan-Dec	---	---	---	None
Avalon	B	Jan-Dec	---	---	---	None

Table 17.--Water Features--Continued

Map symbol and soil name	Hydro- logic group	Month	Water table: Upper limit	Water table: Lower limit	Flooding: Duration	Flooding: Frequency
			Ft	Ft		
52:						
Northwater	B					
		Jan-Dec	---	---	---	None
Adel	B					
		Jan-Dec	---	---	---	None
53:						
Pagoda	C					
		Jan-Dec	---	---	---	None
Hesperus	B					
		Jan-Dec	---	---	---	None
54:						
Panitchen	B					
		Jan-Dec	---	---	---	None
55:						
Parachute	B					
		Jan-Dec	---	---	---	None
Irigul	D					
		Jan-Dec	---	---	---	None
56:						
Parachute	B					
		Jan-Dec	---	---	---	None
Irigul	D					
		Jan-Dec	---	---	---	None
Rhone	B					
		Jan-Dec	---	---	---	None
57:						
Parachute	B					
		Jan-Dec	---	---	---	None
Rhone	B					
		Jan-Dec	---	---	---	None
58:						
Peninsula	B					
		Jan-Dec	---	---	---	None
59:						
Persayo	D					
		Jan-Dec	---	---	---	None
60:						
Redcreek	D					
		Jan-Dec	---	---	---	None
Rentsac	D					
		Jan-Dec	---	---	---	None

Table 17.--Water Features--Continued

Map symbol and soil name	Hydro-logic group	Month	Water table: Upper limit	Water table: Lower limit	Flooding: Duration	Flooding: Frequency
			Ft	Ft		
61:						
Rock outcrop	D					
		Jan-Dec	---	---	---	None
Torriorthents	D					
		Jan-Dec	---	---	---	None
62:						
Shawa	B					
		Jan-Dec	---	---	---	None
63:						
Silas	B					
		March	---	---	Brief	Rare
		April	3.5-6.0	>6.0	Brief	Rare
		May	3.5-6.0	>6.0	Brief	Rare
		June	3.5-6.0	>6.0	Brief	Rare
64:						
Torrifluvents	B					
		April	---	---	Brief	Occasional
		May	---	---	Brief	Occasional
		June	---	---	Brief	Occasional
Gullied land	---					
		January	---	---	Brief	Occasional
		February	---	---	Brief	Occasional
		March	---	---	Brief	Occasional
		April	---	---	Brief	Occasional
		May	---	---	Brief	Occasional
		June	---	---	Brief	Occasional
		July	---	---	Brief	Occasional
		August	---	---	Brief	Occasional
		September	---	---	Brief	Occasional
		December	---	---	Brief	Occasional
65:						
Torriorthents	D					
		Jan-Dec	---	---	---	None
Rock outcrop	D					
		Jan-Dec	---	---	---	None
66:						
Torriorthents	D					
		Jan-Dec	---	---	---	None
Rock outcrop	D					
		Jan-Dec	---	---	---	None
67:						
Tosca	B					
		Jan-Dec	---	---	---	None
68:						
Trail	A					
		March	---	---	Brief	Rare
		April	---	---	Brief	Rare
		May	---	---	Brief	Rare
		June	---	---	Brief	Rare

Table 17.--Water Features--Continued

Map symbol and soil name	Hydro-logic group	Month	Water table: Upper limit	Water table: Lower limit	Flooding: Duration	Flooding: Frequency
			Ft	Ft		
69:						
Travessilla	D					
		Jan-Dec	---	---	---	None
Rock outcrop	D					
		Jan-Dec	---	---	---	None
70:						
Uffens	B					
		Jan-Dec	---	---	---	None
71:						
Utso	B					
		Jan-Dec	---	---	---	None
Rock outcrop	D					
		Jan-Dec	---	---	---	None
72:						
Wesdy	C					
		Jan-Dec	---	---	---	None
73:						
Wesdy	C					
		Jan-Dec	---	---	---	None
Northwater	B					
		Jan-Dec	---	---	---	None
74:						
Winnemucca	C					
		Jan-Dec	---	---	---	None
Castino	C					
		Jan-Dec	---	---	---	None
75:						
Wrayha	D					
		Jan-Dec	---	---	---	None
Rabbitex	B					
		Jan-Dec	---	---	---	None
Veatch	B					
		Jan-Dec	---	---	---	None
76:						
Wrayha	D					
		Jan-Dec	---	---	---	None
Veatch	B					
		Jan-Dec	---	---	---	None
Rabbitex	B					
		Jan-Dec	---	---	---	None
77:						
Yamo	B					
		Jan-Dec	---	---	---	None
Redcreek	D					
		Jan-Dec	---	---	---	None

Table 17.--Water Features--Continued

Map symbol and soil name	Hydro-logic group	Month	Water table: Upper limit	Water table: Lower limit	Flooding: Duration	Flooding: Frequency
			Ft	Ft		
78:						
Youngston	B					
		Jan-Dec	---	---	---	None
79:						
Water.						

Table 18.--Soil Features

(See text for definitions of terms used in this table. Absence of an entry indicates that the feature is not a concern or that the data were not estimated.)

Map symbol and soil name	Restrictive layer: Kind	Restrictive layer: Depth to top	Potential for frost action	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
		In			
1:					
Aga	---	---	Low	High	Low
2:					
Badland	Bedrock (paralithic)	0-3	None	---	---
3:					
Barx	---	---	Low	High	High
4:					
Barx	---	---	Low	High	High
Clapper	---	---	Low	High	High
5:					
Battlement	---	---	Low	High	Low
6:					
Battlement	---	---	Low	High	High
7:					
Biedsaw	---	---	Low	High	Low
Sunup	Bedrock (lithic)	10-20	Low	High	Moderate
8:					
Billings	---	---	High	High	High
9:					
Bookcliff	---	---	Moderate	Moderate	Low
Utso	Bedrock (paralithic)	40-60	Moderate	Moderate	Low
10:					
Borollic Calciorthids	Bedrock (paralithic)	30-80	Low	High	Low
11:					
Borpark	---	---	Low	High	High
12:					
Bunkwater	---	---	Low	High	Moderate
13:					
Caballo	Bedrock (paralithic)	40-60	Moderate	Moderate	Low
14:					
Callings	---	---	Moderate	Moderate	Low
15:					
Cameo	---	---	Moderate	Moderate	Low

Table 18.--Soil Features--Continued

Map symbol and soil name	Restrictive layer		Potential for frost action	Risk of corrosion	
	Kind	Depth to top		Uncoated steel	Concrete
		In			
16:					
Castino	Bedrock (lithic)	20-40	Moderate	Moderate	Low
Skisams	Bedrock (lithic)	5-20	Moderate	High	Low
Winnemucca	---	---	Moderate	Moderate	Low
17:					
Cathedral	Bedrock (lithic)	10-20	Moderate	Moderate	Moderate
Veatch	Bedrock (lithic)	20-40	Low	Moderate	Low
18:					
Cerro	---	---	Low	Moderate	Low
19:					
Cerro	---	---	Low	Moderate	Low
20:					
Cerro	---	---	Low	Moderate	Low
21:					
Chipeta	Bedrock (paralithic)	5-20	Low	High	High
22:					
Clapper	---	---	Low	High	High
23:					
Clapper	---	---	Low	High	High
24:					
Cochetopa	---	---	Moderate	Moderate	Low
Clayburn	---	---	Moderate	Moderate	Low
25:					
Cowestglen	---	---	Low	High	Moderate
26:					
Cryochrepts	Bedrock (paralithic)	24-80	Low	Moderate	Moderate
Cryoborolls	Bedrock (paralithic)	20	Low	Moderate	Low
Rubble land	Bedrock (lithic)	40	None	---	---
27:					
Cryorthents	Bedrock (paralithic)	10-40	Moderate	Moderate	Low
Rock outcrop	Bedrock (lithic)	0	None	---	---
28:					
Cumulic Haploborolls	---	---	Low	Moderate	Low
29:					
Debeque	---	---	Moderate	High	Low

Table 18.--Soil Features--Continued

Map symbol and soil name	Restrictive layer: Kind	Restrictive layer: Depth to top	Potential for frost action	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
		In			
30:					
Debeque	---	---	Moderate	High	Low
Hesperus	---	---	Moderate	Moderate	Low
31:					
Dominguez	---	---	Low	Moderate	Low
32:					
Dominguez	---	---	Low	Moderate	Low
33:					
Emmons	---	---	Moderate	High	High
Cerro	---	---	Low	Moderate	Low
Pagoda	---	---	Low	Moderate	Low
34:					
Empedrado	---	---	Moderate	High	Low
35:					
Empedrado	---	---	Moderate	High	Low
Pagoda	---	---	Low	Moderate	Low
Godding	---	---	Low	Moderate	Low
36:					
Fluvaquents	---	---	High	High	Moderate
37:					
Fughes	---	---	Moderate	Moderate	Low
38:					
Fughes	---	---	Moderate	Moderate	Low
39:					
Fughes	---	---	Moderate	Moderate	Low
Hesperus	---	---	Moderate	Moderate	Low
40:					
Godding	---	---	Low	Moderate	Low
41:					
Golime	---	---	Low	Moderate	Low
42:					
Grobutte	---	---	Low	Moderate	Low
43:					
Haploborolls	Bedrock (lithic)	10-60	Moderate	Moderate	Low
Rock outcrop	Bedrock (lithic)	0	None	---	---
44:					
Happle	---	---	Moderate	High	Low

Table 18.--Soil Features--Continued

Map symbol and soil name	Restrictive layer: Kind	Restrictive layer: Depth to top	Potential for frost action	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
		In			
45:					
Happle	---	---	Moderate	High	Low
46:					
Happle	---	---	Moderate	High	Low
Rock outcrop	Bedrock (lithic)	0	None	---	---
47:					
Hesperus	---	---	Moderate	Moderate	Low
Empedrado	---	---	Moderate	High	Low
Pagoda	---	---	Low	Moderate	Low
48:					
Hesperus	---	---	Moderate	Moderate	Low
Empedrado	---	---	Moderate	High	Low
Pagoda	---	---	Low	Moderate	Low
49:					
Hesperus	---	---	Moderate	Moderate	Low
Pagoda	---	---	Low	Moderate	Low
50:					
Irigul	Bedrock (lithic)	5-20	Low	Moderate	Low
Starman	Bedrock (lithic)	3-20	Moderate	High	Low
51:					
Mesa	---	---	Low	High	Moderate
Avalon	---	---	Moderate	High	Moderate
52:					
Northwater	---	---	Moderate	Moderate	Low
Adel	---	---	Moderate	Moderate	Low
53:					
Pagoda	---	---	Low	Moderate	Low
Hesperus	---	---	Moderate	Moderate	Low
54:					
Panitchen	---	---	Low	Low	Moderate
55:					
Parachute	Bedrock (paralithic)	20-40	Moderate	Moderate	Low
Irigul	Bedrock (lithic)	5-20	Low	Moderate	Low
56:					
Parachute	Bedrock (paralithic)	20-40	Moderate	Moderate	Low

Table 18.--Soil Features--Continued

Map symbol and soil name	Restrictive layer: Kind	Restrictive layer: Depth to top	Potential for frost action	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
		In			
56:					
Irigul	Bedrock (lithic)	5-20	Low	Moderate	Low
Rhone	Bedrock (paralithic)	40-60	Moderate	Moderate	Low
57:					
Parachute	Bedrock (paralithic)	20-40	Moderate	Moderate	Low
Rhone	Bedrock (paralithic)	40-60	Moderate	Moderate	Low
58:					
Peninsula	---	---	Low	High	Low
59:					
Persayo	Bedrock (paralithic)	4-20	Low	High	Moderate
60:					
Redcreek	Bedrock (lithic)	10-20	Low	Moderate	Low
Rentsac	Bedrock (lithic)	10-20	Moderate	High	Low
61:					
Rock outcrop	Bedrock (lithic)	0	None	---	---
Torriorthents	Bedrock (lithic)	5-20	Low	Moderate	Low
62:					
Shawa	---	---	Moderate	Moderate	Low
63:					
Silas	---	---	Moderate	Moderate	Low
64:					
Torrifluvents	---	---	Low	High	High
Gullied land	---	---	None	---	---
65:					
Torriorthents	Bedrock (lithic)	4-60	Low	Moderate	Low
Rock outcrop	Bedrock (lithic)	0	None	---	---
66:					
Torriorthents	Bedrock (lithic)	4-60	Low	Moderate	Low
Rock outcrop	Bedrock (paralithic)	0	None	---	---
67:					
Tosca	---	---	Moderate	High	High
68:					
Trail	---	---	Low	Moderate	Low
69:					
Travessilla	Bedrock (lithic)	4-20	Low	Moderate	Low
Rock outcrop	Bedrock (lithic)	0	None	---	---

Table 18.--Soil Features--Continued

Map symbol and soil name	Restrictive layer		Potential for frost action	Risk of corrosion	
	Kind	Depth to top		Uncoated steel	Concrete
		In			
70:					
Uffens	---	---	Low	High	High
71:					
Utso	---	---	Moderate	Moderate	Low
Rock outcrop	Bedrock (lithic)	0	None	---	---
72:					
Wesdy	---	---	Low	Moderate	Low
73:					
Wesdy	---	---	Low	Moderate	Low
Northwater	---	---	Moderate	Moderate	Low
74:					
Winnemucca	---	---	Moderate	Moderate	Low
Castino	Bedrock (lithic)	20-40	Moderate	Moderate	Low
75:					
Wrayha	---	---	Low	High	Low
Rabbitex	---	---	Moderate	High	Moderate
Veatch	Bedrock (lithic)	20-40	Low	Moderate	Low
76:					
Wrayha	---	---	Low	High	Low
Veatch	Bedrock (lithic)	20-40	Low	Moderate	Low
Rabbitex	---	---	Moderate	High	Moderate
77:					
Yamo	---	---	Low	Moderate	Low
Redcreek	Bedrock (lithic)	10-20	Low	Moderate	Low
78:					
Youngston	---	---	Low	High	Moderate
79:					
Water.					

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (USDA, 1999). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 19 shows the classification of the soils in the survey area. In this survey, the soils were classified according to the third edition of "Keys to Soil Taxonomy" (USDA, 1987). The categories are defined in the following paragraphs.

ORDER. Twelve soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Mollisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Boroll (*Bor*, meaning cool, plus *oll*, from Mollisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; type of saturation; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Argiborolls (*Argi*, meaning a horizon of illuvial clay accumulation, plus *boroll*, the suborder of the Mollisols that has cool annual soil temperatures).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic subgroup is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other taxonomic class. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Argiborolls.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Generally, the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle size, mineral content, soil temperature regime, soil depth, and reaction. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine-loamy, mixed Typic Argiborolls.

SERIES. The series consists of soils within a family that have horizons similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile.

Table 19.--Classification of the Soils

(An asterisk in the first column indicates a taxadjunct to the series. See text for a description of those characteristics that are outside the range of the series.)

Soil name	Family or higher taxonomic class
Adel	Fine-loamy, mixed Pachic Cryoborolls
Aga	Coarse-loamy over sandy or sandy-skeletal, mixed (calcareous), mesic Typic Torrifluvents
Avalon	Fine-loamy, mixed, mesic Typic Calciorthids
Barx	Fine-loamy, mixed, mesic Ustollic Haplargids
Battlement	Fine-loamy, mixed (calcareous), frigid Ustic Torrifluvents
Biedsaw	Fine, montmorillonitic (calcareous), mesic Ustic Torriorthents
Billings	Fine-silty, mixed (calcareous), mesic Typic Torrifluvents
Bookcliff	Fine-loamy, mixed Typic Argiborolls
Borollic Calciorthids	Borollic Calciorthids
Borpark	Loamy-skeletal, mixed Typic Argiborolls
Bunkwater	Fine-loamy, mixed, mesic Ustollic Natrargids
Caballo	Loamy-skeletal, mixed Pachic Cryoborolls
Callings	Clayey-skeletal, montmorillonitic Boralfic Cryoborolls
Cameo	Coarse-loamy, mixed (calcareous), mesic Ustic Torrifluvents
Castino	Clayey-skeletal, montmorillonitic Argic Pachic Cryoborolls
Cathedral	Loamy-skeletal, mixed Lithic Haploborolls
Cerro	Fine, montmorillonitic Ustertic Argiborolls
Chipeta	Clayey, mixed (calcareous), mesic, shallow Typic Torriorthents
Clapper	Loamy-skeletal, mixed, mesic Ustollic Calciorthids
Clayburn	Fine-loamy, mixed Argic Pachic Cryoborolls
Cochetopa	Fine, montmorillonitic Argic Pachic Cryoborolls
Cowestglen	Coarse-loamy, mixed (calcareous), frigid Ustic Torrifluvents
Cryoborolls	Cryoborolls
Cryochrepts	Cryochrepts
Cryorthents	Cryorthents
Cumulic Haploborolls	Cumulic Haploborolls
Debeque	Loamy-skeletal, mixed Entic Haploborolls
Dominguez	Fine, montmorillonitic, mesic Ustertic Camborthids
Emmons	Fine-loamy, mixed Aridic Calciborolls
Empedrado	Fine-loamy, mixed Typic Argiborolls
Fluvaquents	Fluvaquents
Fughes	Fine, montmorillonitic Pachic Argiborolls
Godding	Clayey-skeletal, montmorillonitic Pachic Argiborolls
Golime	Clayey-skeletal, montmorillonitic Pachic Argiborolls
Grobutte	Loamy-skeletal, mixed (calcareous), frigid Ustic Torriorthents
Haploborolls	Haploborolls
Happle	Loamy-skeletal, mixed (calcareous), mesic Ustic Torriorthents
Hesperus	Fine-loamy, mixed Pachic Argiborolls
Irigul	Loamy-skeletal, mixed Lithic Cryoborolls
*Mesa	Fine-loamy, mixed, mesic Typic Haplargids
Northwater	Loamy-skeletal, mixed Cryic Pachic Paleborolls
Pagoda	Fine, montmorillonitic Pachic Argiborolls
Panitchen	Fine-loamy, mixed (calcareous), mesic Ustic Torrifluvents
Parachute	Loamy-skeletal, mixed Typic Cryoborolls
Peninsula	Fine, montmorillonitic Typic Argiborolls
Persayo	Loamy, mixed (calcareous), mesic, shallow Typic Torriorthents
Rabbitex	Fine-loamy, mixed Typic Calciborolls
Redcreek	Loamy, mixed (calcareous), frigid Lithic Ustic Torriorthents
Rentsac	Loamy-skeletal, mixed (calcareous), frigid Lithic Ustic Torriorthents
Rhone	Fine-loamy, mixed Pachic Cryoborolls
Shawa	Fine-loamy, mixed Pachic Haploborolls
Silas	Fine-loamy, mixed Cumulic Cryoborolls
Skisams	Loamy, mixed Lithic Cryoborolls
Starman	Loamy-skeletal, mixed (calcareous) Lithic Cryorthents
Sunup	Loamy-skeletal, mixed (calcareous), mesic Lithic Ustic Torriorthents
Torrifluvents	Torrifluvents
Torriorthents	Torriorthents
Tosca	Loamy-skeletal, mixed Typic Calciborolls
Trail	Sandy, mixed, mesic Typic Torrifluvents

Table 19.--Classification of the Soils--Continued

Soil name	Family or higher taxonomic class
Travessilla	Loamy, mixed (calcareous), mesic Lithic Ustic Torriorthents
Uffens	Fine-loamy, mixed, mesic Typic Natrargids
Utso	Loamy-skeletal, mixed Pachic Haploborolls
Veatch	Loamy-skeletal, mixed Typic Haploborolls
Wesdy	Clayey-skeletal, mixed Argic Cryoborolls
Winnemucca	Clayey-skeletal, montmorillonitic Argic Pachic Cryoborolls
Wrayha	Fine, montmorillonitic (calcareous), frigid Ustic Torriorthents
Yamo	Fine-loamy, mixed Borollic Camborthids
Youngston	Fine-loamy, mixed (calcareous), mesic Typic Torrifluvents

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. Characteristics of the soil and the material in which it formed are identified for each series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the "Soil Survey Manual" (USDA, 1993). Many of the technical terms used in the descriptions are defined in "Soil Taxonomy" (USDA, 1999) and in "Keys to Soil Taxonomy" (USDA, 1987). Unless otherwise indicated, matrix colors in the descriptions are for dry soil. Following the pedon description is the range of important characteristics of the soils in the series.

Adel Series

The Adel series consists of deep, well drained soils on footslopes, side slopes, and swales. These soils formed in colluvium derived from mixed material. Slope ranges from 5 to 50 percent. Average annual precipitation is 18 to 25 inches, and average annual air temperature is 36 to 40 degrees F.

These soils are classified as fine-loamy, mixed Pachic Cryoborolls.

Typical pedon of Adel clay loam, in an area of Northwater-Adel complex, 5 to 50 percent slopes, about 1,800 feet east and 1,000 feet south of the northwest corner of sec. 26, T. 5 S., R. 102 W.

A1—0 to 5 inches; dark grayish brown (10YR 4/2) clay loam, very dark brown (10YR 2/2) moist; moderate medium granular structure; hard, very friable, slightly sticky and slightly plastic; neutral; abrupt smooth boundary.

A2—5 to 20 inches; dark grayish brown (10YR 4/2) clay loam, very dark brown (10YR 2/2) moist; weak coarse subangular blocky structure parting to moderate very fine subangular blocky; very hard, friable, sticky and plastic; neutral; clear wavy boundary.

Bw—20 to 31 inches; brown (10YR 5/3) clay loam, dark brown (10YR 3/3) moist; weak coarse subangular blocky structure parting to moderate very fine subangular blocky; very hard, friable, sticky and plastic; neutral; gradual wavy boundary.

C—31 to 60 inches; brown (10YR 5/3) clay loam, dark brown (10YR 4/3) moist; massive; very hard, friable, sticky and plastic; neutral.

The mollic epipedon is 16 to 40 inches thick. The profile contains 0 to 15 percent gravel and rock fragments. The content of clay ranges from 18 to 30 percent. Hue is 2.5Y or 10YR.

Aga Series

The Aga series consists of deep, well drained soils on river terraces and flood plains. These soils formed in alluvium. Slope ranges from 0 to 3 percent. Elevation is 4,500 to 5,200 feet. Average annual precipitation is 8 to 10 inches, and average annual air temperature is 46 to 52 degrees F.

These soils are classified as coarse-loamy over sandy or sandy-skeletal, mixed (calcareous), mesic Typic Torrifluvents.

Typical pedon of Aga very fine sandy loam, 0 to 3 percent slopes, about 1,800 feet south and 1,700 feet west of the northeast corner of sec. 7, T. 8 S., R. 96 W.

A1—0 to 3 inches; brown (10YR 5/3) very fine sandy

loam, dark brown (10YR 4/3) moist; moderate medium granular structure; soft, very friable, slightly sticky and slightly plastic; slightly effervescent; moderately alkaline; clear smooth boundary.

A2—3 to 7 inches; pale brown (10YR 6/3) very fine sandy loam, dark brown (10YR 4/3) moist; moderate thin platy structure; slightly hard, very friable, slightly sticky and slightly plastic; strongly effervescent; moderately alkaline; clear smooth boundary.

C1—7 to 16 inches; brown (10YR 5/3) very fine sandy loam, dark brown (10YR 4/3) moist; weak medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; strongly effervescent; moderately alkaline; clear wavy boundary.

C2—16 to 20 inches; brown (10YR 5/3) sandy loam, dark brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; strongly effervescent; moderately alkaline; clear wavy boundary.

C3—20 to 28 inches; pale brown (10YR 6/3) loamy sand, dark brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; 10 percent gravel, 2 percent cobbles; slightly effervescent; moderately alkaline; clear wavy boundary.

2C4—28 to 60 inches; variegated extremely gravelly sand; single grain; loose, nonsticky and nonplastic; 55 percent gravel, 25 percent cobbles; slightly effervescent; moderately alkaline.

Avalon Series

The Avalon series consists of deep, well drained soils on high terraces and bench edges. These soils formed in alluvium derived dominantly from sedimentary rocks. Slope ranges from 3 to 12 percent. Average annual precipitation is 7 to 11 inches, and average annual air temperature is 50 to 52 degrees F.

These soils are classified as fine-loamy, mixed, mesic Typic Calciorthids.

Reference pedon of Avalon loam, in an area of Mesa-Avalon complex, 3 to 12 percent slopes, about 900 feet west and 100 feet south of the northeast corner of sec. 18, T. 8 S., R. 102 W.

A—0 to 6 inches; brown (7.5YR 5/4) loam, brown (7.5YR 5/4) moist; weak thick platy structure parting to weak fine granular; soft, friable, nonsticky and nonplastic; slightly effervescent; moderately alkaline; clear smooth boundary.

Bw—6 to 16 inches; light yellowish brown (10YR 6/4) loam, yellowish brown (10YR 5/4) moist; weak fine subangular blocky structure; soft, friable, slightly sticky and slightly plastic; 1 percent gravel; strongly effervescent; moderately alkaline; clear smooth boundary.

Bk1—16 to 40 inches; light gray (10YR 7/2) loam, light brownish gray (10YR 6/2) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; 10 percent gravel and 3 percent cobbles; violently effervescent; lime occurs as threads and filaments; moderately alkaline; clear wavy boundary.

Bk2—40 to 60 inches; very pale brown (10YR 7/4) gravelly sandy loam, light yellowish brown (10YR 6/4) moist; massive; slightly hard, friable, nonsticky and nonplastic; 20 percent gravel, 10 percent cobbles; lime coatings on bottom side of pebbles; violently effervescent; moderately alkaline.

The depth to the upper boundary of the calcic horizon ranges from 10 to 30 inches.

The A horizon has hue of 10YR or 7.5YR.

The Bk horizon has hue of 10YR to 2.5Y.

Barx Series

The Barx series consists of deep, well drained soils on structural benches. These soils formed in eolian material. Slope ranges from 3 to 12 percent. Average annual precipitation is 12 to 16 inches, and average annual air temperature is 46 to 52 degrees F.

These soils are classified as fine-loamy, mixed, mesic Ustollic Haplargids.

Typical pedon of Barx loam, 3 to 12 percent slopes, about 1,100 feet west and 400 feet south of the northeast corner of sec. 25, T. 9 S., R. 97 W.

A—0 to 3 inches; brown (7.5YR 5/4) loam, dark brown (7.5YR 4/4) moist; weak very fine granular structure; slightly hard, very friable, slightly sticky and slightly plastic; slightly alkaline; clear smooth boundary.

Bt—3 to 10 inches; reddish brown (5YR 5/4) clay loam, reddish brown (5YR 4/4) moist; moderate medium subangular blocky structure; slightly hard, very friable, sticky and plastic; slightly alkaline; clear wavy boundary.

Btk—10 to 14 inches; reddish brown (5YR 5/4) clay loam, reddish brown (5YR 4/4) moist; moderate medium subangular blocky structure; hard, friable, sticky and plastic; 2 percent soft lime masses; violently effervescent; moderately alkaline; clear wavy boundary.

Bk1—14 to 27 inches; pink (5YR 8/3) loam, pink (5YR 7/3) moist; weak medium subangular blocky

structure; hard, very friable, slightly sticky and slightly plastic; 21 percent calcium carbonate; disseminated lime; violently effervescent; strongly alkaline; gradual wavy boundary.

Bk2—27 to 40 inches; pink (5YR 7/3) loam, light reddish brown (5YR 6/4) moist; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; 15 percent calcium carbonate; disseminated lime; violently effervescent; strongly alkaline; gradual wavy boundary.

C—40 to 60 inches; light reddish brown (5YR 6/4) loam, reddish brown (5YR 5/4) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; 9 percent calcium carbonate; violently effervescent; strongly alkaline.

Depth to secondary lime ranges from 9 to 19 inches.

The A horizon has hue of 7.5YR. Reaction is neutral or slightly alkaline.

The Bt horizon has hue of 5YR or 7.5YR. Reaction is slightly alkaline or moderately alkaline. The content of clay ranges from 20 to 32 percent.

The Bk and C horizons have hue of 5YR to 7.5YR. Reaction is moderately alkaline or strongly alkaline.

Battlement Series

The Battlement series consists of deep, well drained soils on flood plains, low stream terraces, and narrow valley bottoms. These soils formed in alluvium derived from sandstone, shale, limestone, and siltstone. Slope ranges from 1 to 8 percent. Average annual precipitation is 12 to 16 inches, and average annual air temperature is 42 to 46 degrees F.

These soils are classified as fine-loamy, mixed (calcareous), frigid Ustic Torrifluvents.

Typical pedon of Battlement loam, 1 to 8 percent slopes, about 1,400 feet south and 1,300 feet west of the northeast corner of sec. 20, T. 7 S., R. 101 W.

A—0 to 6 inches; dark grayish brown (2.5Y 4/2) loam, dark grayish brown (2.5Y 4/2) moist; weak fine granular structure; soft, very friable, slightly sticky and slightly plastic; slightly effervescent; slightly alkaline; clear wavy boundary.

C—6 to 22 inches; light brownish gray (2.5Y 6/2) loam, grayish brown (2.5Y 5/2) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; bedding planes of thin strata of sandy loam material; strongly effervescent; moderately alkaline; clear wavy boundary.

2Ab—22 to 31 inches; grayish brown (2.5Y 5/2) clay loam, dark grayish brown (2.5Y 4/2) moist; moderate medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; thin strata of fine sandy loam; strongly effervescent; moderately alkaline; clear wavy boundary.

2Bw—31 to 45 inches; pale brown (10YR 6/3) clay loam, brown (10YR 5/3) moist; moderate medium subangular blocky structure; hard, friable, sticky and slightly plastic; strongly effervescent; moderately alkaline; abrupt wavy boundary.

2C—45 to 60 inches; light brownish gray (2.5Y 6/2) sandy loam, grayish brown (2.5Y 5/2) moist; massive; hard, friable, slightly sticky and slightly plastic; strongly effervescent; moderately alkaline.

Biedsaw Series

The Biedsaw series consists of deep, well drained soils on mountain side slopes and ridges. These soils formed in colluvium over residuum or in residuum derived from the variegated Wasatch Formation. Slope ranges from 10 to 40 percent. Average annual precipitation is 12 to 14 inches, and average annual air temperature is 46 to 52 degrees F.

These soils are classified as fine, montmorillonitic (calcareous), mesic Ustic Torriorthents.

Typical pedon of Biedsaw gravelly loam, in an area of Biedsaw-Sunup gravelly loams, 10 to 40 percent slopes, approximately 2,100 feet north and 500 feet west of the southeast corner of sec. 3, T. 8 S., R. 98 W.

A—0 to 4 inches; brown (10YR 5/3) gravelly loam, dark brown (10YR 4/3) moist; weak fine granular structure; soft, friable, nonsticky and slightly plastic; 20 percent gravel; strongly effervescent; moderately alkaline; clear smooth boundary.

Bw—4 to 9 inches; brown (10YR 5/3) loam, dark brown (10YR 4/3) moist; moderate fine subangular blocky structure; soft, friable, nonsticky and slightly plastic; strongly effervescent; moderately alkaline; clear wavy boundary.

2Bk1—9 to 19 inches; pale brown (10YR 6/3) clay loam, dark brown (10YR 4/3) moist; massive; hard, firm, slightly sticky and slightly plastic; lime occurs as spots; violently effervescent; moderately alkaline; clear wavy boundary.

2Bk2—19 to 43 inches; weak red (2.5YR 4/2) clay loam, dark reddish gray (5YR 4/2) moist; massive; hard, friable, sticky and plastic; lime occurs as spots; strongly effervescent; moderately alkaline; clear smooth boundary.

2Bk3—43 to 60 inches; dark reddish gray (10R 4/1) and light brownish gray (2.5Y 6/2) silty clay loam,

brown (7.5YR 5/2) moist; massive; hard, friable, slightly sticky and plastic; lime occurs as spots; strongly effervescent; moderately alkaline.

Some pedons do not have the lithologic discontinuity. The colors are variegated throughout the profile. The content of clay ranges from 30 to 40 percent in the upper part of the particle-size control section and from 35 to 45 percent in the lower part. The weighted average is more than 35 percent clay. Reaction is slightly alkaline to strongly alkaline. Hue ranges from 2.5Y to 5YR in the A and Bw horizons and from 2.5Y to 10R in the Bk horizon.

Billings Series

The Billings series consists of deep, well drained soils on flood plains and low terraces. These soils formed in alluvium. Slope ranges from 1 to 6 percent. Average annual precipitation is 7 to 10 inches, and average annual air temperature is 47 to 52 degrees F.

These soils are classified as fine-silty, mixed (calcareous), mesic Typic Torrifluvents.

Typical pedon of Billings silty clay loam, 1 to 6 percent slopes, about 1,750 feet south and 750 feet east of the northwest corner of sec. 15, T. 8 S., R. 104 W.

A—0 to 3 inches; light brownish gray (2.5Y 6/2) silty clay loam, grayish brown (2.5Y 5/2) moist; moderate fine crumb structure; soft, very friable, slightly sticky and slightly plastic; strongly effervescent; moderately alkaline; abrupt smooth boundary.

AC—3 to 7 inches; light brownish gray (2.5Y 6/2) silty clay loam, grayish brown (2.5Y 5/2) moist; massive; bedding planes and thin strata; slightly hard, friable, sticky and slightly plastic; strongly effervescent; moderately alkaline; clear smooth boundary.

Cz—7 to 13 inches; light brownish gray (2.5Y 6/2) silty clay loam, grayish brown (2.5Y 5/2) moist; massive; slightly hard, friable, sticky and slightly plastic; few fine generally rounded disseminated salt nodules; bedding planes and thin strata; strongly effervescent; moderately alkaline; clear smooth boundary.

C1—13 to 21 inches; light yellowish brown (2.5Y 6/4) clay loam, dark grayish brown (2.5Y 4/2) moist; massive; soft, very friable, slightly sticky and slightly plastic; bedding planes and thin strata; strongly effervescent; moderately alkaline; clear smooth boundary.

C2—21 to 28 inches; grayish brown (2.5Y 5/2) silty clay loam with thin strata of sandy clay loam, dark grayish brown (2.5Y 4/2) moist; weak fine subangular blocky structure; slightly hard, firm, sticky and slightly plastic; strongly effervescent; moderately alkaline; abrupt smooth boundary.

Cy—28 to 43 inches; light yellowish brown (2.5Y 6/4) silty clay loam, olive brown (2.5Y 4/4) moist; weak coarse subangular blocky structure; slightly hard, friable, sticky and plastic; common fine irregularly shaped disseminated gypsum occurs in filaments; strongly effervescent; slightly alkaline; gradual smooth boundary.

C—43 to 60 inches; yellowish brown (10YR 5/4) fine sandy loam, brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; strongly effervescent; slightly alkaline.

Hue is 10YR to 5Y. The content of clay in the particle-size control section ranges from 27 to 35 percent. Reaction is slightly alkaline to strongly alkaline.

Bookcliff Series

The Bookcliff series consists of deep, well drained soils on summits and shoulders of upland plateaus. These soils formed in residuum derived dominantly from limy sandstone. Slope ranges from 3 to 25 percent. Elevation is 7,800 to 8,600 feet. Average annual precipitation is 16 to 20 inches, and average annual air temperature is 40 to 43 degrees F.

The Bookcliff soils in this survey area differ from the official series description because they have a calcic horizon. These soils are classified as fine-loamy, mixed Typic Argiborolls.

Typical pedon of Bookcliff loam, in an area of Bookcliff-Utso, cool, complex, 3 to 25 percent slopes, about 2,500 feet north and 500 feet west of the southeast corner of sec. 23, T. 5 S., R. 104 W.

A—0 to 2 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; soft, very friable, nonsticky and slightly plastic; slightly alkaline; abrupt smooth boundary.

Bt1—2 to 10 inches; brown (10YR 4/3) loam, dark brown (10YR 3/3) moist; weak coarse subangular blocks parting to moderate fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; slightly alkaline; clear smooth boundary.

Bt2—10 to 18 inches; brown (10YR 5/3) loam, dark brown (10YR 4/3) moist; moderate medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; strongly effervescent; slightly alkaline; clear wavy boundary.

Btk—18 to 25 inches; pale brown (10YR 6/3) gravelly loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; 15 percent gravel, 10 percent cobbles; strongly effervescent; 11 percent calcium carbonate equivalent; moderately alkaline; gradual wavy boundary.

Bk1—25 to 36 inches; pale brown (10YR 6/3) gravelly loam, brown (10YR 4/3) moist; massive; soft, friable, slightly sticky and slightly plastic; disseminated lime; 15 percent gravel, 10 percent cobbles; violently effervescent; 17 percent calcium carbonate equivalent; moderately alkaline; clear wavy boundary.

Bk2—36 to 42 inches; very pale brown (10YR 7/3) cobbly loam, pale brown (10YR 6/3) moist; massive; soft, friable, slightly sticky and slightly plastic; 10 percent gravel, 20 percent cobbles; violently effervescent; disseminated lime; 35 percent calcium carbonate equivalent; moderately alkaline; gradual wavy boundary.

Bk3—42 to 60 inches; pale brown (10YR 6/3) very cobbly loam, brown (10YR 4/3) moist; massive; soft, friable, slightly sticky and slightly plastic; 15 percent gravel, 30 percent cobbles; strongly effervescent; disseminated lime; 24 percent calcium carbonate equivalent; moderately alkaline.

The A horizon has hue of 10YR or 7.5YR.

The Bt horizon has hue of 10YR or 7.5YR. It is loam or clay loam.

The content of rock fragments ranges from 25 to 45 percent in the Bk horizon.

Borollic Calciorthids

Borollic Calciorthids consist of moderately deep or deep, well drained soils on side slopes and toeslopes. These soils formed in colluvium derived from mixed sedimentary rocks. Slope ranges from 25 to 50 percent. Elevation is 7,000 to 8,000 feet. Average annual precipitation is 15 to 20 inches, and average annual air temperature is 40 to 46 degrees F.

These soils are classified as Borollic Calciorthids.

Reference pedon of Borollic Calciorthids, 25 to 50 percent slopes, about 2,600 feet south and 750 feet west of the northeast corner of sec. 4, T. 9 S., R. 94 W.

A—0 to 4 inches; dark grayish brown (10YR 4/2) loam, dark brown (10YR 3/3) moist; moderate fine crumb structure; soft, very friable, slightly sticky and slightly plastic; 5 percent gravel, 3 percent cobbles; neutral; clear wavy boundary.

Bw—4 to 11 inches; dark brown (10YR 4/3) clay loam, dark grayish brown (10YR 4/2) moist; moderate fine subangular blocky structure; slightly hard, friable, slightly sticky and plastic; 5 percent gravel; slightly effervescent; slightly alkaline; abrupt wavy boundary.

Bk1—11 to 36 inches; very pale brown (10YR 7/3) silt loam, pale brown (10YR 6/3) moist; weak fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; disseminated lime; 43 percent calcium carbonate equivalent; violently effervescent; moderately alkaline; gradual wavy boundary.

Bk2—36 to 60 inches; very pale brown (10YR 7/3) silt loam, light gray (10YR 7/2) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; disseminated lime; 60 percent calcium carbonate equivalent; violently effervescent; moderately alkaline.

Depth to hard or soft bedrock ranges from 30 to more than 60 inches. Thickness of the solum ranges from 8 to 22 inches. The content of rock fragments in the control section ranges from 5 to 65 percent. The content of clay in the control section ranges from 18 to 35 percent. Lime is at a depth of 0 to 4 inches. The content of calcium carbonates ranges from 5 to 60 percent.

The A horizon has hue of 10YR or 2.5Y. The content of rock fragments ranges from 0 to 20 percent. Reaction is neutral or slightly alkaline.

The Bw horizon has hue of 10YR or 2.5Y. The content of rock fragments ranges from 0 to 10 percent. Reaction is slightly alkaline or moderately alkaline.

The Bk horizon has hue of 10YR or 2.5Y. The texture of the fine-earth fraction ranges from sandy loam to clay loam. The content of rock fragments ranges from 0 to 65 percent. Reaction is slightly alkaline or moderately alkaline.

Borpark Series

The Borpark series consists of deep, well drained soils on stony breaks. These soils formed in colluvium derived from basalt and shale. Slope ranges from 40 to 75 percent. Elevation is 5,800 to 7,000 feet. Average annual precipitation is 16 to 20 inches, and average annual air temperature is 40 to 46 degrees F.

These soils are classified as loamy-skeletal, mixed Typic Argiborolls.

Typical pedon of Borpark stony loam, 40 to 75 percent slopes, about 1,400 feet west and 700 feet south of the northeast corner of sec. 30, T. 9 S., R. 94 W.

A—0 to 2 inches; brown (10YR 5/3) stony loam, dark brown (10YR 3/3) moist; weak fine granular structure; slightly hard, friable, slightly sticky and nonplastic; 10 percent gravel, 10 percent cobbles, 15 percent stones; 5 percent calcium carbonate equivalent; strongly effervescent; slightly alkaline; abrupt smooth boundary.

Bt—2 to 8 inches; brown (10YR 4/3) cobbly clay loam, dark brown (10YR 3/3) moist; weak fine subangular blocky structure; slightly hard, friable, sticky and plastic; 10 percent gravel, 10 percent cobbles, 5 percent stones; 5 percent calcium carbonate equivalent; strongly effervescent; slightly alkaline; clear smooth boundary.

Btk1—8 to 22 inches; brown (10YR 5/3) very cobbly clay loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; hard, firm, sticky and plastic; 15 percent gravel, 20 percent cobbles, 10 percent stones; 7 percent calcium carbonate equivalent; strongly effervescent; slightly alkaline; gradual wavy boundary.

Btk2—22 to 41 inches; pale brown (10YR 6/3) very cobbly clay loam, brown (10YR 5/3) moist; moderate medium subangular blocky structure; slightly hard, friable, sticky and plastic; 15 percent gravel, 20 percent cobbles, 15 percent stones; 12 percent calcium carbonate equivalent; strongly effervescent; moderately alkaline; gradual wavy boundary.

Bk—41 to 60 inches; white (10YR 8/2) extremely cobbly silt loam, pale brown (10YR 6/3) moist; massive; soft, friable, nonsticky and nonplastic; 20 percent gravel, 30 percent cobbles, 20 percent stones; 18 percent calcium carbonate equivalent; disseminated lime; violently effervescent; moderately alkaline; clear wavy boundary.

C—60 to 66 inches; light brownish gray (10YR 6/2) extremely stony sandy loam, grayish brown (10YR 5/2) moist; massive; soft, friable, nonsticky and nonplastic; 20 percent gravel, 30 percent cobbles, 25 percent stones; 5 percent calcium carbonate equivalent; strongly effervescent; moderately alkaline.

The mollic epipedon is 8 to 15 inches thick. The content of rock fragments in the particle-size control section ranges from 35 to 60 percent.

The A horizon has hue of 10YR. The content of clay ranges from 15 to 24 percent.

The Btk horizon has hue of 7.5YR or 10YR. The content of clay ranges from 28 to 35 percent.

The Bk horizon has hue of 10YR or 7.5YR. The content of clay ranges from 20 to 30 percent.

Bunkwater Series

The Bunkwater series consists of deep, well drained soils on structural benches. These soils formed in eolian material. Slope ranges from 1 to 8 percent. Average annual precipitation is 10 to 12 inches, and average annual air temperature is 46 to 52 degrees F.

These soils are classified as fine-loamy, mixed, mesic Ustollic Natrargids.

Typical pedon of Bunkwater very fine sandy loam, 1 to 8 percent slopes, about 850 feet east and 200 feet south of the northwest corner of sec. 15, T. 8 S., R. 97 W.

E—0 to 2 inches; pink (7.5YR 7/4) very fine sandy loam, brown (7.5YR 4/4) moist; moderate thin platy structure parting to weak fine granular; slightly hard, very friable, nonsticky and nonplastic; moderately alkaline; abrupt smooth boundary.

Btn—2 to 7 inches; reddish brown (5YR 5/4) clay loam, reddish brown (5YR 4/4) moist; moderate medium columnar structure parting to moderate medium subangular blocks; hard, friable, sticky and plastic; strongly alkaline; clear smooth boundary.

Btkn—7 to 13 inches; light reddish brown (5YR 6/4) clay loam, reddish brown (5YR 4/4) moist; moderate fine subangular blocky structure; hard, friable, sticky and plastic; common medium calcium nodules; strongly effervescent; very strongly alkaline; clear wavy boundary.

Bkn—13 to 33 inches; light reddish brown (5YR 6/4) clay loam, reddish brown (5YR 5/4) moist; weak medium subangular blocky structure; hard, friable, sticky and plastic; many fine calcium nodules; strongly effervescent; very strongly alkaline; clear wavy boundary.

Bk1—33 to 42 inches; light brown (7.5YR 6/4) clay loam, brown (7.5YR 5/4) moist; massive; slightly hard, friable, sticky and plastic; violently effervescent; few fine calcium nodules; very strongly alkaline; gradual wavy boundary.

Bk2—42 to 60 inches; light brown (7.5YR 6/4) silty clay loam, brown (7.5YR 5/4) moist; massive; slightly hard, friable, sticky and plastic; violently effervescent; few fine calcium nodules; strongly alkaline.

The content of rock fragments in the particle-size control section ranges from 0 to 15 percent. Lime is at a depth of 5 to 13 inches. Depth to the top of the natric

horizon ranges from 2 to 6 inches. Fine gypsum crystals occur in some pedons.

The E horizon has hue of 7.5YR or 10YR.

The Btn horizon has hue of 5YR or 7.5YR. The content of clay ranges from 20 to 35 percent.

The Btkn and Bk horizons have hue of 7.5YR or 10YR. The content of clay ranges from 20 to 35 percent. Reaction is strongly alkaline or very strongly alkaline.

Caballo Series

The Caballo series consists of deep, well drained soils on side slopes. These soils formed in colluvium and residuum derived from Green River shale. Slope ranges from 40 to 80 percent. Elevation is 8,000 to 8,700 feet. Average annual precipitation is 21 to 25 inches, and average annual air temperature is 36 to 40 degrees F.

These soils are classified as loamy-skeletal, mixed Pachic Cryoborolls.

Typical pedon of Caballo very channery loam, 40 to 80 percent slopes, about 2,250 feet south and 1,500 feet west of the northeast corner of sec. 18, T. 5 S., R. 101 W.

A—0 to 6 inches; dark brown (10YR 4/3) very channery loam, very dark grayish brown (10YR 3/2) moist; weak very fine crumb structure; soft, very friable, nonsticky and slightly plastic; 40 percent channers; slightly alkaline; clear wavy boundary.

Bw1—6 to 18 inches; dark brown (10YR 4/3) very channery loam, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; 45 percent channers and 10 percent flagstones; slightly effervescent; slightly alkaline; clear wavy boundary.

Bw2—18 to 36 inches; brown (10YR 5/3) extremely channery loam, dark brown (10YR 3/3) moist; weak fine granular structure; soft, friable, nonsticky and slightly plastic; 50 percent channers and 25 percent flagstones; strongly effervescent; moderately alkaline; clear wavy boundary.

C—36 to 44 inches; pale brown (10YR 6/3) extremely channery loam, dark grayish brown (10YR 4/2) moist; massive; soft, friable, nonsticky and slightly plastic; 50 percent channers and 35 percent flagstones; violently effervescent; moderately alkaline; abrupt wavy boundary.

Cr—44 inches; fractured shale and marlstone.

Bedrock is at a depth of 42 to 60 inches. The mollic epipedon is 17 to 36 inches thick. The content of rock fragments in the particle-size control section averages between 35 and 75 percent. Some pedons do not have a B horizon.

The content of rock fragments ranges from 35 to 55 percent in the A horizon. Reaction is neutral or slightly alkaline.

The texture of the fine-earth fraction is loam in the Bw horizon. The content of rock fragments ranges from 35 to 75 percent. Reaction is neutral to moderately alkaline.

The texture of the fine-earth fraction is loam in the C horizon. The content of rock fragments ranges from 65 to 85 percent. Reaction is neutral to moderately alkaline.

Callings Series

The Callings series consists of deep, well drained soils on mesa tops. These soils formed in glacial till in which the surface has been modified by loess derived dominantly from basalt. Slope ranges from 1 to 10 percent. Elevation is 9,900 to 10,050 feet. Average annual precipitation is 25 to 30 inches, and average annual air temperature is 36 to 40 degrees F.

These soils are classified as clayey-skeletal, montmorillonitic Boralfic Cryoborolls.

Typical pedon of Callings loam, 1 to 10 percent slopes, about 900 feet north and 1,600 feet west of the southeast corner of sec. 35, T. 11 S., R. 97 W.

A1—0 to 5 inches; brown (10YR 4/3) loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; slightly acid; clear smooth boundary.

A2—5 to 11 inches; brown (10YR 4/3) loam, very dark grayish brown (10YR 3/2) moist; moderate fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; slightly acid; clear wavy boundary.

E—11 to 15 inches; light brownish gray (10YR 6/2) loam, dark grayish brown (10YR 4/2) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; neutral; clear wavy boundary.

2Bt1—15 to 29 inches; brown (7.5YR 5/4) very cobbly clay, dark brown (7.5YR 4/4) moist; moderate medium subangular blocky structure; very hard, very firm, sticky and plastic; 10 percent pebbles, 20 percent cobbles, 5 percent stones; neutral; clear wavy boundary.

2Bt2—29 to 46 inches; brown (7.5YR 5/4) very cobbly clay, dark brown (7.5YR 4/4) moist; moderate medium subangular blocky structure; very hard,

very firm, sticky and plastic; 10 percent pebbles, 25 percent cobbles, 5 percent stones; neutral; gradual wavy boundary.

2BC—46 to 60 inches; brown (7.5YR 5/4) very cobbly clay, dark brown (7.5YR 4/4) moist; weak coarse subangular blocky structure; very hard, very firm, sticky and plastic; 10 percent pebbles, 25 percent cobbles, 5 percent stones; neutral.

The content of rock fragments in the particle-size control section ranges from 35 to 50 percent.

The 2Bt horizon is very cobbly clay or very cobbly clay loam. The content of clay ranges from 35 to 45 percent.

Cameo Series

The Cameo series consists of deep, well drained soils on flood plains and low terraces. These soils formed in calcareous, stratified alluvium derived from mixed sources. Slope ranges from 1 to 6 percent. Average annual precipitation is 12 to 16 inches, and average annual air temperature is 50 to 54 degrees F.

These soils are classified as coarse-loamy, mixed (calcareous), mesic Ustic Torrifluvents.

Typical pedon of Cameo fine sandy loam, 1 to 6 percent slopes, in an unsectionalized area near the center of sec. 29, T. 7 S., R. 102 W.

A—0 to 4 inches; very pale brown (10YR 7/4) fine sandy loam, yellowish brown (10YR 5/4) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and common fine and medium roots; 5 percent gravel and channers; strongly effervescent; disseminated lime; slightly alkaline; clear smooth boundary.

C—4 to 60 inches; light yellowish brown (2.5Y 6/4), stratified sandy loam and loamy sand, light olive brown (2.5Y 5/4) moist; massive; slightly hard, very friable, nonsticky and nonplastic; common very fine and few fine and medium roots to a depth of 30 inches; lime disseminated and occurring as particle coatings on rock fragments below a depth of 20 inches; 5 percent gravel and channers; strongly effervescent; moderately alkaline.

The content of clay ranges from 7 to 18 percent. The content of rock fragments ranges from 0 to 15 percent.

The A and C horizons have hue of 2.5Y or 10YR.

Castino Series

The Castino series consists of moderately deep, well drained soils on till plains and basalt flows. These soils formed in glacial till modified by eolian material derived dominantly from basalt. Slope ranges from 1 to 10 percent. Elevation is 9,900 to 10,000 feet. Average annual precipitation is 25 to 30 inches, and average annual air temperature is 36 to 40 degrees F.

These soils are classified as clayey-skeletal, montmorillonitic Argic Pachic Cryoborolls.

Typical pedon of Castino loam, in an area of Castino-Skisams-Winnemucca loams, 1 to 10 percent slopes, stony, about 2,500 feet north and 1,100 feet east of the southwest corner of sec. 34, T. 11 S., R. 97 W. About 0.01 to 0.1 percent of the surface is covered with stones.

A1—0 to 9 inches; dark brown (10YR 4/3) loam, very dark brown (10YR 2/2) moist; moderate fine granular structure; soft, very friable, nonsticky and nonplastic; slightly acid; clear wavy boundary.

A2—9 to 16 inches; dark brown (10YR 4/3) loam, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure parting to moderate fine granular; slightly hard, friable, slightly sticky and slightly plastic; neutral; clear wavy boundary.

Bt1—16 to 21 inches; yellowish brown (10YR 5/4) cobbly clay loam, dark yellowish brown (10YR 4/4) moist; weak medium subangular blocky structure parting to moderate fine subangular blocky; hard, firm, sticky and plastic; few thin clay films in pores; 15 percent cobbles; neutral; clear wavy boundary.

2Bt2—21 to 29 inches; brown (7.5YR 4/4) very cobbly clay loam, brown (7.5YR 4/4) moist; moderate medium subangular blocky structure; very hard, very firm, sticky and plastic; many thin clay films on peds and in pores; 10 percent gravel, 25 percent cobbles, 5 percent stones; neutral; clear wavy boundary.

2Bt3—29 to 38 inches; brown (7.5YR 4/2) very cobbly clay, dark brown (7.5YR 4/2) moist; weak coarse prismatic structure parting to strong medium angular blocky; extremely hard, extremely firm, very sticky and very plastic; continuous thin clay films on peds and in pores; 10 percent gravel, 25 percent cobbles, 5 percent stones; neutral; abrupt wavy boundary.

2R—38 inches; basalt bedrock.

Bedrock is at a depth of 20 to 40 inches. The content of rock fragments in the particle-size control section ranges from 35 to 50 percent.

The A horizon has hue of 7.5YR or 10YR.

The Bt horizon has hue of 10YR or 7.5YR. It is cobbly clay loam, very cobbly clay loam, or very cobbly clay. The content of clay ranges from 35 to 45 percent.

Cathedral Series

The Cathedral series consists of shallow, well drained soils on mountainsides. These soils formed in residuum derived dominantly from sandstone. Slope ranges from 25 to 85 percent. Average annual precipitation is 16 to 20 inches, and average annual air temperature is 42 to 44 degrees F.

These soils are classified as loamy-skeletal, mixed Lithic Haploborolls.

Typical pedon of Cathedral very stony sandy loam, in an area of Cathedral-Veatch complex, 25 to 85 percent slopes, about 200 feet west and 2,500 feet south of the northeast corner of sec. 30, T. 6 S., R. 102 W.

Oe—1 inch to 0; decomposing leaves.

A—0 to 5 inches; dark grayish brown (10YR 4/2) very stony sandy loam, very dark grayish brown (10YR 3/2) moist; weak coarse granular structure parting to weak fine granular; soft, very friable, nonplastic and nonsticky; 20 percent gravel, 15 percent cobbles, 3 percent stones; neutral; clear wavy boundary.

Bw—5 to 11 inches; grayish brown (10YR 5/2) very gravelly sandy loam, dark grayish brown (10YR 4/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; 25 percent gravel, 10 percent cobbles, 3 percent stones; neutral; abrupt wavy boundary.

R—11 inches; massive, medium grained, hard sandstone.

Bedrock is at a depth of 10 to 20 inches. The content of rock fragments ranges from 35 to 75 percent.

The A horizon has hue of 2.5Y to 7.5YR.

Cerro Series

The Cerro series consists of deep, well drained soils on foothills. These soils formed in colluvium and residuum derived from marine shales. Slope ranges from 2 to 30 percent. Elevation is 6,600 to 8,000 feet. Average annual precipitation is 15 to 20 inches, and average annual air temperature is about 41 degrees F.

These soils are classified as fine, montmorillonitic Ustertic Argiborolls.

Typical pedon of Cerro silty clay loam, 12 to 25 percent slopes, approximately 1,000 feet east and 2,000 feet north of the southwest corner of sec. 30, T. 8 S., R. 92 W.

A1—0 to 2 inches; grayish brown (10YR 5/2) silty clay loam, dark brown (10YR 3/3) moist; moderate medium platy structure; slightly hard, very friable, sticky and plastic; 5 percent gravel; neutral; clear wavy boundary.

A2—2 to 7 inches; brown (10YR 5/3) silty clay loam, dark brown (10YR 3/3) moist; weak coarse subangular blocky structure parting to moderate medium granules; slightly hard, friable, sticky and plastic; common very fine tubular and common very fine interstitial pores; conspicuous cracks (some more than 1 inch in width); 5 percent gravel; neutral; abrupt wavy boundary.

Bt1—7 to 12 inches; brown (10YR 5/3) silty clay loam, dark brown (10YR 3/3) moist; weak coarse prismatic structure parting to medium and fine angular blocks; very hard, friable, sticky and plastic; common thin clay films on faces of peds and many moderately thick clay films occurring as linings of pores; intersecting slickensides; cracks up to 1 inch in width; common inped roots; 5 percent gravel; slightly effervescent; slightly alkaline; clear wavy boundary.

Bt2—12 to 22 inches; light yellowish brown (10YR 6/4) silty clay; common fine faint streaks of very pale brown (10YR 7/3), brown (10YR 4/3) moist; moderate medium prismatic structure parting to strong medium angular blocks; very hard, firm, sticky and plastic; thin or moderately thick wax coatings on faces of peds and occurring as linings in pores; intersecting slickensides; cracks as wide as 0.4 inch; common roots, mainly exped; 5 percent gravel and cobbles combined; slightly effervescent; moderately alkaline; clear wavy boundary.

Bt3—22 to 35 inches; light yellowish brown (10YR 6/4) silty clay; common fine faint streaks of very pale brown (10YR 7/3), brown (10YR 4/3) moist; moderate medium prismatic structure parting to medium angular blocks; very hard, firm, sticky and plastic; thin clay films on faces of peds and occurring as linings in pores; intersecting slickensides; common roots grading to few roots, mainly exped; 5 percent gravel; slightly effervescent; moderately alkaline; clear wavy boundary.

Bk—35 to 44 inches; very pale brown (10YR 7/4) silty clay loam, yellowish brown (10YR 5/4) moist; massive; very hard, firm, sticky and plastic; few roots; 5 percent gravel-sized shale fragments;

strongly effervescent; disseminated lime; moderately alkaline; gradual wavy boundary.

Bk/Cr—44 to 60 inches; light yellowish brown (10YR 6/4), pinkish gray (7.5YR 6/2), pink (7.5YR 7/4), and white (N 8/0 and 10YR 8/2) silty clay loam (Bk); light yellowish brown (10YR 6/4) and pinkish gray (7.5YR 6/2) moist; highly weathered shale (Cr) that readily crushes to silty clay loam; massive; very hard, firm, sticky and plastic; very few roots; 5 percent gravel-sized shale fragments; disseminated lime; strongly effervescent; moderately alkaline.

The mollic epipedon is 10 to 14 inches thick. The content of rock fragments in the particle-size control section ranges from 0 to 15 percent. The fragments are mostly less than 10 inches in diameter. Depth to lime ranges from 12 to 30 inches. The content of clay ranges from 35 to 50 percent throughout the profile. Hue is 7.5YR or 10YR.

Chipeta Series

The Chipeta series consists of shallow, well drained soils on rolling hills, ridges, and toeslopes. These soils formed in residuum derived from calcareous gypsiferous shale. Slope ranges from 3 to 30 percent. Average annual precipitation is 6 to 10 inches, and average annual air temperature is 47 to 52 degrees F.

These soils are classified as clayey, mixed (calcareous), mesic, shallow Typic Torriorthents.

Typical pedon of Chipeta silty clay loam, 3 to 30 percent slopes, about 400 feet south and 600 feet west of the northeast corner of sec. 16, T. 8 S., R. 102 W.

A—0 to 4 inches; light brownish gray (2.5Y 6/2) silty clay loam, dark grayish brown (2.5Y 4/2) moist; moderate fine granular structure; soft, very friable, sticky and plastic; slightly effervescent; slightly alkaline; clear wavy boundary.

C—4 to 10 inches; grayish brown (2.5Y 5/2) silty clay, dark grayish brown (2.5Y 4/2) moist; massive; hard, firm, sticky and plastic; slightly effervescent; slightly alkaline; gradual wavy boundary.

Cy—10 to 13 inches; grayish brown (2.5Y 5/2) silty clay, dark grayish brown (2.5Y 4/2) moist; massive; hard, firm, sticky and plastic; 8 percent medium irregularly shaped gypsum nodules; slightly effervescent; slightly alkaline; clear wavy boundary.

Cr—13 inches; weathered shale.

Paralithic contact is at a depth of 10 to 20 inches. Hue is 2.5Y or 5Y throughout the profile. The content of clay ranges from 35 to 45 percent. Reaction is slightly alkaline or moderately alkaline.

Clapper Series

The Clapper series consists of deep, well drained soils on mountain side slopes. These soils formed in residuum derived from glacial till containing basalt stones. Slope ranges from 3 to 65 percent. Average annual precipitation is 12 to 15 inches, and average annual air temperature is 46 to 52 degrees F.

These soils are classified as loamy-skeletal, mixed, mesic Ustollic Calciorthids.

Typical pedon of Clapper very stony loam, 25 to 65 percent slopes, about 100 feet east and 100 feet south of the northwest corner of sec. 29, T. 8 S., R. 96 W.

A—0 to 3 inches; brown (10YR 5/3) very stony loam, dark brown (10YR 4/3) moist; moderate fine granular structure; soft, very friable, slightly sticky and slightly plastic; 10 percent gravel, 15 percent cobbles, 20 percent stones; strongly effervescent; moderately alkaline; clear smooth boundary.

Bw—3 to 12 inches; brown (10YR 5/3) very stony loam, dark brown (10YR 4/3) moist; moderate fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; 10 percent gravel, 20 percent cobbles, 10 percent stones; strongly effervescent; strongly alkaline; clear wavy boundary.

Bk1—12 to 26 inches; very pale brown (10YR 7/3) very cobbly loam, pale brown (10YR 6/3) moist; weak medium subangular blocky structure; slightly hard, friable, sticky and plastic; 5 percent soft lime masses; 19 percent calcium carbonate; 20 percent gravel, 20 percent cobbles, 2 percent stones; violently effervescent; strongly alkaline; clear wavy boundary.

Bk2—26 to 60 inches; light yellowish brown (10YR 6/4) very cobbly loam, yellowish brown (10YR 5/4) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; 3 percent soft lime masses; 12 percent calcium carbonate; 30 percent gravel, 20 percent cobbles, 1 percent stones; violently effervescent; strongly alkaline.

Hue is 7.5YR or 10YR. The content of rock fragments in the particle-size control section ranges from 35 to 80 percent. Secondary lime is at a depth of 8 to 16 inches. The content of clay in the particle-size control section ranges from 18 to 27 percent. The calcium carbonate equivalent ranges from 15 to 40 percent.

Clayburn Series

The Clayburn series consists of deep, well drained soils on foothills and old mudflows. These soils formed in colluvium and localized alluvium derived from mixed shale and sandstone. Slope ranges from 12 to 40 percent. Elevation is 7,800 to 8,800 feet. Average annual precipitation is 22 to 25 inches, and average annual air temperature is about 39 degrees F.

These soils are classified as fine-loamy, mixed Argic Pachic Cryoborolls.

Typical pedon of Clayburn loam, in an area of Cochetopa-Clayburn complex, 12 to 40 percent slopes, about 550 feet east and 1,450 feet south of the northwest corner of sec. 2, T. 9 S., R. 93 W.

A1—0 to 2 inches; grayish brown (10YR 5/2) loam, very dark brown (10YR 2/2) moist; weak fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine and few fine roots; many very fine inped and exped pores (collectively); neutral; clear smooth boundary.

A2—2 to 13 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure parting to moderate fine granules; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots; common very fine and few fine tubular pores; neutral; clear wavy boundary.

AB—13 to 18 inches; grayish brown (10YR 5/2) clay loam, very dark grayish brown (10YR 3/2) moist; weak coarse subangular blocky structure parting to moderate medium granules; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots; common very fine and few fine tubular pores; clay bridges on and between sand grains and thin clay films lining pores; neutral; clear wavy boundary.

Bt1—18 to 33 inches; brown (10YR 5/3) clay loam, dark brown (10YR 3/3) moist; weak coarse subangular blocky structure parting to moderate fine subangular blocks; hard, friable, sticky and plastic; few very fine roots; common very fine tubular and few fine and very fine irregular pores; clay bridges and few thin clay films on faces of peds and many thin and moderately thick clay films lining tubular pores; neutral; clear wavy boundary.

Bt2—33 to 46 inches; brown (10YR 5/3) clay loam, dark brown (10YR 3/3) moist; weak coarse subangular blocky structure; hard, friable, slightly sticky and slightly plastic; few very fine roots; few very fine pores; clay bridges and few thin clay films on faces of peds and occurring as linings of pores; neutral; clear wavy boundary.

CB—46 to 60 inches; light yellowish brown (10YR 6/4) loam, brown (10YR 5/3) moist; massive; hard, friable, slightly sticky and slightly plastic; very few roots; common very fine tubular and irregular pores (collectively); few thin clay films lining pores; 5 percent pebbles; neutral.

The mollic epipedon is 28 to 50 inches thick. The thickness of the solum ranges from 36 to 50 inches. The content of rock fragments in the control section ranges from 0 to 15 percent.

The A horizon has value of 3 to 5 and chroma of 1 or 2.

The Bt horizon has hue of 7.5YR, value of 4 or 5, and chroma of 2 to 4. The content of clay ranges from 25 to 35 percent.

Cochetopa Series

The Cochetopa series consists of deep, well drained soils on foothills and old mudflows. These soils formed in colluvium derived dominantly from shales. Slope ranges from 12 to 40 percent. Elevation is 7,800 to 8,800 feet. Average annual precipitation is 22 to 25 inches, and average annual air temperature is about 39 degrees F.

These soils are classified as fine, montmorillonitic Argic Pachic Cryoborolls.

Typical pedon of Cochetopa clay loam, in an area of Cochetopa-Clayburn complex, 12 to 40 percent slopes, approximately 1,600 feet west and 2,200 feet north of the southeast corner of sec. 35, T. 9 S., R. 93 W.

A1—0 to 2 inches; dark gray (10YR 4/1) clay loam, very dark brown (10YR 2/2) moist; moderate medium granular structure parting to strong fine granules; slightly hard, friable, slightly sticky and slightly plastic; neutral; abrupt wavy boundary.

A2—2 to 8 inches; dark gray (10YR 4/1) clay loam, very dark brown (10YR 2/2) moist; moderate medium subangular blocky structure parting to strong fine granules; slightly hard, friable, sticky and plastic; common very fine irregular inped pores; neutral; clear wavy boundary.

AB—8 to 20 inches; dark grayish brown (10YR 4/2) clay loam, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure; hard, friable, sticky and plastic; clay bridges on and between sand grains and few thin clay films on faces of peds; common fine and few medium irregular pores; neutral; clear wavy boundary.

Bt1—20 to 33 inches; dark grayish brown (10YR 4/2) clay loam, dark brown (10YR 3/3) moist; moderate

medium and coarse angular blocky structure; hard, firm, sticky and plastic; common thin clay films on faces of peds and many moderately thick clay films lining pores; common very fine, few fine, and few medium tubular pores; neutral; abrupt wavy boundary.

Bt2—33 to 45 inches; yellowish brown (10YR 5/4) clay, brown (7.5YR 5/4) moist; moderate coarse angular blocky structure parting to strong medium angular blocks; very hard, firm, very sticky and very plastic; many thin and moderately thick clay films on faces of peds and thick continuous clay films lining pores; common very fine inped pores; neutral; clear wavy boundary.

BC—45 to 51 inches; variegated yellowish brown (10YR 5/4 and 5/6) clay loam with common fine faint and distinct mottles of light yellowish brown (2.5Y 6/4), olive yellow (2.5Y 6/6), and light brown (7.5YR 6/4); brown (7.5YR 5/4) moist and rubbed; weak medium subangular blocky structure; hard, friable, sticky and plastic; clay bridges of sand grains; flecks of mica; common very fine tubular inped pores; few roots; neutral; clear wavy boundary.

C—51 to 60 inches; variegated lithochromic light yellowish brown (2.5Y 6/4) and pale olive (5Y 6/4) clay loam, light yellowish brown (2.5Y 6/4) moist and rubbed; few fine distinct dark grayish brown (2.5Y 4/2) and white (2.5Y 8/2) and few fine prominent reddish yellow (7.5YR 6/6) mottles; massive; hard, friable, sticky and plastic; few very fine pores; very few roots; neutral.

The A horizon has value of 3 or 4 and chroma of 1 or 2.

The Bt horizon has hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 1 to 4. It is clay loam or clay. The content of clay ranges from 35 to 55 percent. The content of rock fragments ranges from 0 to 10 percent. Reaction is neutral or slightly alkaline.

Reaction in the C horizon is neutral or slightly alkaline.

Cowestglen Series

The Cowestglen series consists of deep, well drained soils on flood plains, low terraces, and alluvial fans. These soils formed in stratified calcareous alluvium derived dominantly from sedimentary rocks. Slope ranges from 1 to 8 percent. Average annual precipitation is 12 to 15 inches, and average annual air temperature is 42 to 45 degrees F.

These soils are classified as coarse-loamy, mixed (calcareous), frigid Ustic Torrifluvents.

Typical pedon of Cowestglen sandy loam, 1 to 8 percent slopes, about 1,800 feet north and 100 feet west of the southeast corner of sec. 34, T. 6 S., R. 104 W.

A—0 to 6 inches; light brownish gray (2.5Y 6/2) sandy loam, grayish brown (2.5Y 5/2) moist; weak medium platy structure; slightly hard, friable, slightly sticky and slightly plastic; strongly effervescent; moderately alkaline; clear smooth boundary.

C1—6 to 20 inches; light brownish gray (2.5Y 6/2) fine sandy loam, grayish brown (2.5Y 5/2) moist; massive; slightly hard, very friable, nonsticky and nonplastic; strongly effervescent; moderately alkaline; clear wavy boundary.

C2—20 to 38 inches; light brownish gray (2.5Y 6/2) loam, grayish brown (2.5Y 5/2) moist; massive; slightly hard, very friable, nonsticky and nonplastic; 5 percent gravel; strongly effervescent; moderately alkaline; clear wavy boundary.

C3—38 to 60 inches; light brownish gray (2.5Y 6/2), stratified sandy loam, fine sandy loam, and silt loam, grayish brown (2.5Y 5/2) moist; massive; soft, very friable, nonsticky and nonplastic; 5 percent gravel; strongly effervescent; moderately alkaline.

These soils are typically calcareous throughout, but some pedons are leached in the upper 6 inches. The content of clay ranges from 10 to 18 percent throughout the profile.

The A and C horizons have hue of 2.5Y or 10YR.

Cryoborolls

Cryoborolls consist of deep and moderately deep, well drained soils on mountain side slopes. These soils formed in colluvium derived from basalt and Green River shale or colluvium over residuum derived from Green River shale. Slope ranges from 15 to 35 percent. Elevation is 8,700 to 9,500 feet. Average annual precipitation is 25 to 30 inches, and average annual air temperature is 35 to 39 degrees F.

Reference pedon of Cryoborolls, in an area of Cryochrepts-Cryoborolls-Rubble land complex, 15 to 90 percent slopes, about 9 miles west of Skyway, approximately 600 feet south and 1,300 feet east of the northwest corner of sec. 28, T. 11 S., R. 97 W.

A1—0 to 2 inches; very dark gray (10YR 3/1) loam, black (10YR 2/1) moist; weak fine granular structure; soft, very friable, slightly sticky and slightly plastic; 10 percent gravel, 3 percent cobbles; neutral; clear wavy boundary.

A2—2 to 9 inches; dark grayish brown (10YR 4/2) gravelly loam, very dark brown (10YR 2/2) moist; weak fine subangular blocky structure parting to moderate medium granular; slightly hard, friable, slightly sticky and slightly plastic; 20 percent gravel, 10 percent cobbles; slightly acid; clear wavy boundary.

A3—9 to 17 inches; dark grayish brown (10YR 4/2) very cobbly loam, very dark brown (10YR 2/2) moist; weak fine subangular blocky structure parting to moderate medium granular; slightly hard, friable, slightly sticky and slightly plastic; 25 percent gravel, 25 percent cobbles; neutral; clear wavy boundary.

Bt—17 to 28 inches; about equal proportions of yellowish brown (10YR 5/4) and light brownish gray (2.5Y 6/2) very cobbly clay loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; hard, friable, sticky and plastic; 35 percent gravel, 20 percent cobbles; neutral; gradual wavy boundary.

BC—28 to 42 inches; light brownish gray (2.5Y 6/2) and light gray (2.5Y 7/2) extremely cobbly clay loam with mottles of light yellowish brown (2.5Y 6/4); yellowish brown (10YR 5/4) moist and rubbed; weak coarse subangular blocks parting to moderate medium subangular blocky structure; hard, friable, sticky and plastic; 30 percent gravel, 35 percent cobbles; neutral; gradual wavy boundary.

C—42 to 60 inches; light brownish gray (2.5Y 6/2) and pale brown (10YR 6/3) very cobbly loam and very cobbly clay loam, yellowish brown (10YR 5/4) moist; massive; hard, friable, slightly sticky and slightly plastic; 10 percent channers, 15 percent cobbles, 10 percent flagstones; neutral.

The mollic epipedon is 10 to 22 inches thick. Reaction is slightly acid or neutral throughout the profile. The content of rock fragments in the particle-size control section ranges from 25 to 75 percent. Some pedons have an argillic horizon. Particle-size classes include loamy-skeletal, fine-loamy, and fine. Depth to paralithic contact ranges from 24 to more than 60 inches.

Cryochrepts

Cryochrepts consist of moderately deep and deep, well drained soils on foothills and old debris flows. These soils formed in colluvium derived from basalt and Green River shale or colluvium over residuum derived from Green River shale. Slope ranges from 15 to 35 percent. Elevation is 8,700 to 9,500 feet. Average annual precipitation is 25 to 30 inches, and average annual air temperature is 35 to 39 degrees F.

Reference pedon of Cryochrepts, in an area of Cryochrepts-Cryoborolls-Rubble land complex, 15 to 90 percent slopes, about 5 miles west and 2 miles south of Skyway, approximately 900 feet north and 1,300 feet west of the southeast corner of sec. 25, T. 11 S., R. 97 W. About 5 to 10 percent of the surface is covered with stones and boulders.

O—3 inches to 0; needles, leaves, stems, and twigs in various stages of decomposition.

A—0 to 8 inches; light gray (10YR 7/2) extremely stony loam, grayish brown (10YR 5/2) moist; some weak medium granular structure in the top 3 inches, otherwise massive; soft, very friable, nonsticky and nonplastic; 5 percent gravel and channers, 35 percent cobblestones, 30 percent stones and boulders; moderately acid; clear smooth boundary.

Bw—8 to 16 inches; brown (7.5YR 5/4) very cobbly loam, dark brown (7.5YR 4/4) moist; weak medium subangular blocky structure with some peds parting to moderate fine aggregates; slightly hard, friable, slightly sticky and slightly plastic; 15 percent channers and gravel, 20 percent cobblestones, 15 percent stones and Green River flagstones; moderately acid; gradual wavy boundary.

C—16 to 60 inches; coarsely stratified, pale brown (10YR 6/3) and light brownish gray (2.5Y 6/2) very flaggy loam and flaggy clay loam, brown (10YR 4/3) and grayish brown (2.5Y 5/2) moist; massive; hard and very hard, friable, sticky and slightly sticky and plastic and slightly plastic; 30 percent channers, 25 percent flagstones; slightly acid grading to neutral with increasing depth.

The solum is 12 to 24 inches thick. The content of rock fragments in the particle-size control section ranges from 15 to 60 percent.

The A horizon has hue of 10YR or 2.5Y. It is loam or fine sandy loam in the fine-earth fraction. Reaction is moderately acid or slightly acid.

The B horizon has hue of 7.5YR or 10YR. It is loam, sandy clay loam, or light clay loam in the fine-earth fraction. Reaction is moderately acid or slightly acid. In a few areas, paralithic contact occurs at a depth as shallow as 24 inches.

Cryorthents

Cryorthents consist of moderately deep and deep, well drained soils on mainly south- or southeast-facing mountainsides and ridges. These soils formed in

residuum and colluvium derived from shale. Slope ranges from 50 to 90 percent. Elevation is 7,500 to 9,500 feet. Average annual precipitation is 16 to 20 inches, and average annual air temperature is 36 to 40 degrees F.

Reference pedon of Cryorthents, in an area of Cryorthents-Rock outcrop complex, 50 to 90 percent slopes, about 2,400 feet north and 700 feet west of the southeast corner of sec. 34, T. 6 S., R. 101 W.

A—0 to 3 inches; grayish brown (10YR 5/2) very channery loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; 50 percent channers, 5 percent cobbles; slightly alkaline; clear smooth boundary.

Bk—3 to 25 inches; light brownish gray (10YR 6/2) extremely channery loam, dark grayish brown (10YR 4/2) moist; weak fine subangular blocky structure; soft, friable, nonsticky and nonplastic; 40 percent channers, 20 percent cobbles, 10 percent stones; strongly effervescent; moderately alkaline; clear wavy boundary.

R—25 inches; hard shale.

Depth to bedrock ranges from 20 to more than 60 inches. Lime is at a depth of 0 to 6 inches.

The content of clay ranges from 15 to 20 percent in the A and Bk horizons.

Cumulic Haploborolls

Cumulic Haploborolls consist of deep, well drained soils on flood plains. These soils formed in alluvium. Slope ranges from 1 to 3 percent. Average annual precipitation is 12 to 18 inches, and average annual air temperature is 40 to 46 degrees F.

Reference pedon of Cumulic Haploborolls, 1 to 3 percent slopes, about 2,500 feet east and 1,340 feet south of the northwest corner of sec. 7, T. 6 S., R. 99 W.

A1—0 to 8 inches; dark grayish brown (10YR 4/2) gravelly sandy clay loam, very dark grayish brown (10YR 3/2) moist; moderate medium granular structure; soft, very friable, slightly sticky and nonplastic; 20 percent gravel, 5 percent channers; strongly effervescent; moderately alkaline; gradual wavy boundary.

A2—8 to 20 inches; grayish brown (10YR 5/2) very channery sandy clay loam, dark brown (10YR 3/3) moist; weak fine granular structure; soft, very friable, slightly sticky and nonplastic; 25 percent gravel, 25 percent channers; strongly effervescent; moderately alkaline; clear wavy boundary.

Bw—20 to 28 inches; grayish brown (10YR 5/2) clay loam, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure; soft, friable, slightly sticky and slightly plastic; slightly effervescent; moderately alkaline; clear wavy boundary.

2C1—28 to 44 inches; light brownish gray (10YR 6/2) very gravelly loamy sand, dark grayish brown (10YR 4/2) moist; massive; soft, very friable, nonsticky and nonplastic; 40 percent gravel, 20 percent channers; strongly effervescent; moderately alkaline; gradual wavy boundary.

2C2—44 to 60 inches; yellow (10YR 7/6) very gravelly sand, dark yellowish brown (10YR 4/6) moist; single grain; loose, nonsticky and nonplastic; 45 percent gravel, 5 percent channers; strongly effervescent; moderately alkaline.

The mollic epipedon is 16 to 45 inches thick. The content of rock fragments in the particle-size control section ranges from 20 to 85 percent. The content of clay ranges from 10 to 35 percent. Hue is 7.5YR to 2.5Y throughout the profile. Reaction is neutral to moderately alkaline.

Debeque Series

The Debeque series consists of deep, well drained soils on toeslopes, in narrow drainageways, and on alluvial fans and old stream terraces. These soils formed in colluvium and alluvium derived dominantly from the Green River shale formation. Slope ranges from 5 to 25 percent. Average annual precipitation is 12 to 18 inches, and average annual air temperature is 40 to 45 degrees F.

These soils are classified as loamy-skeletal, mixed Entic Haploborolls.

Typical pedon of Debeque very channery loam, 5 to 20 percent slopes, about 1,500 feet east and 2,500 feet south of the northwest corner of sec. 16, T. 5 S., R. 99 W.

A—0 to 4 inches; very dark grayish brown (10YR 3/2) very channery loam, very dark brown (10YR 2/2) moist; weak very fine granular structure; soft, very friable, nonsticky and nonplastic; 40 percent channers, 2 percent flagstones, 1 percent stones; slightly alkaline; clear wavy boundary.

AC—4 to 7 inches; brown (10YR 5/3) very channery sandy loam, dark brown (10YR 3/3) moist; moderate medium granular structure; soft, very friable, nonsticky and nonplastic; 45 percent

channers; strongly effervescent; slightly alkaline; gradual wavy boundary.

C—7 to 60 inches; light brownish gray (10YR 6/2) extremely channery sandy loam, dark brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; 60 percent channers, 5 percent flagstones; strongly effervescent; moderately alkaline.

The content of rock fragments in the particle-size control section ranges from 40 to 65 percent. The content of clay ranges from 10 to 25 percent. Lime is at a depth of 0 to 4 inches. Some pedons have a Ck horizon. The mollic epipedon is 7 to 12 inches thick. Hue is 10YR throughout the profile.

The A and AC horizons are 40 to 50 percent channers and 2 to 4 percent flagstones. Reaction is slightly alkaline or moderately alkaline.

The C horizon is 40 to 60 percent channers and 2 to 5 percent flagstones.

Dominguez Series

The Dominguez series consists of deep, well drained soils on alluvial fans and toeslopes. These soils formed in residuum and alluvium derived dominantly from Wasatch shales. Slope ranges from 1 to 8 percent. Average annual precipitation is 12 to 15 inches, and average annual air temperature is 46 to 52 degrees F.

These soils are classified as fine, montmorillonitic, mesic Ustertic Camborthids.

Typical pedon of Dominguez clay loam, 3 to 8 percent slopes, about 1,000 feet east and 1,750 feet south of the northwest corner of sec. 19, T. 9 S., R. 96 W.

A—0 to 3 inches; reddish brown (5YR 5/3) clay loam, reddish brown (5YR 4/3) moist; weak fine granular structure; slightly hard, friable, sticky and plastic; slightly effervescent; moderately alkaline; clear smooth boundary.

Bw1—3 to 8 inches; reddish brown (5YR 5/3) clay, reddish brown (5YR 4/3) moist; weak coarse prismatic structure parting to moderate medium angular blocky; very hard, firm, very sticky and very plastic; strongly effervescent; moderately alkaline; clear smooth boundary.

Bw2—8 to 17 inches; reddish brown (5YR 5/3) clay, reddish brown (5YR 4/3) moist; weak coarse prismatic structure parting to moderate coarse angular blocky; very hard, firm, very sticky and very plastic; strongly effervescent; moderately alkaline; gradual wavy boundary.

Bk1—17 to 30 inches; reddish gray (5YR 5/2) clay, dark reddish gray (5YR 4/2) moist; weak coarse prismatic structure parting to moderate medium angular blocky; very hard, firm, very sticky and very plastic; few fine faint segregated lime filaments; strongly effervescent; strongly alkaline; clear wavy boundary.

Bk2—30 to 38 inches; pinkish gray (5YR 6/2) clay, dark reddish gray (5YR 4/2) moist; massive; hard, friable, sticky and plastic; many medium distinct lime filaments; strongly effervescent; moderately alkaline; clear wavy boundary.

Bk3—38 to 60 inches; pinkish gray (5YR 6/2) clay, dark reddish gray (5YR 4/2) moist; massive; very hard, firm, sticky and plastic; few fine faint lime filaments; strongly effervescent; moderately alkaline.

The A horizon has hue of 5YR or 7.5YR.

The Bw horizon has hue of 2.5YR or 5YR. The content of clay ranges from 35 to 50 percent. Reaction is moderately alkaline or strongly alkaline.

The Bk horizon has hue of 2.5YR or 5YR. Reaction is moderately alkaline or strongly alkaline. Some pedons have discontinuous seams of gypsum.

Emmons Series

The Emmons series consists of deep, well drained soils on structural benches. These soils formed in colluvium and residuum derived from the Wasatch Formation and mixed sources. Slope ranges from 5 to 20 percent. Average annual precipitation is 15 to 17 inches, and average annual air temperature is 40 to 45 degrees F.

The Emmons soils in this survey area have 5 percent less clay in the particle-size control section than is defined as the range for the series. This difference, however, does not affect the classification of these soils, which are classified as fine-loamy, mixed Aridic Calciborolls.

Typical pedon of Emmons loam, in an area of Emmons-Cerro-Pagoda complex, 5 to 30 percent slopes, very stony, about 2,300 feet west and 2,300 feet south of the northeast corner of sec. 34, T. 10 S., R. 97 W. The surface is covered with stones spaced about 5 to 25 feet apart.

A1—0 to 3 inches; brown (10YR 5/3) loam, dark brown (10YR 3/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; slightly effervescent; slightly alkaline; abrupt smooth boundary.

A2—3 to 8 inches; brown (10YR 5/3) loam, dark brown (10YR 3/3) moist; weak medium subangular blocky structure; slightly hard, friable,

slightly sticky and slightly plastic; slightly effervescent; slightly alkaline; clear smooth boundary.

Bw1—8 to 13 inches; brown (10YR 5/3) silt loam, dark brown (10YR 4/3) moist; moderate coarse subangular blocky structure; hard, firm, slightly sticky and slightly plastic; slightly effervescent; slightly alkaline; clear smooth boundary.

Bw2—13 to 19 inches; pale brown (10YR 6/3) silt loam, brown (10YR 5/3) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; segregated lime occurs as seams and soft masses; violently effervescent; moderately alkaline; clear smooth boundary.

Bk1—19 to 30 inches; very pale brown (10YR 8/3) silt loam, pale brown (10YR 6/3) moist; weak fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; 29 percent calcium carbonate; disseminated lime; violently effervescent; strongly alkaline; clear smooth boundary.

Bk2—30 to 60 inches; light gray (10YR 7/2) silt loam, brown (10YR 5/3) moist; weak fine subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; 24 percent calcium carbonate; disseminated lime; violently effervescent; strongly alkaline.

Secondary lime is at a depth of 13 to 30 inches. The content of clay ranges from 18 to 27 percent throughout the profile. Hue is 10YR or 2.5Y.

Empedrado Series

The Empedrado series consists of deep, well drained soils on benches. These soils formed in residuum and colluvium derived dominantly from interbedded sandstone and shale. Slope ranges from 5 to 55 percent. Average annual precipitation is 16 to 20 inches, and average annual air temperature is 42 to 44 degrees F.

These soils are classified as fine-loamy, mixed Typic Argiborolls.

Typical pedon of Empedrado loam, in an area of Hesperus-Empedrado, moist-Pagoda complex, 5 to 35 percent slopes, about 1,350 feet west and 650 feet north of the southeast corner of sec. 11, T. 9 S., R. 94 W.

A—0 to 10 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; soft, friable, slightly sticky and slightly plastic; neutral; clear smooth boundary.

Bt—10 to 21 inches; yellowish brown (10YR 5/4) clay loam, dark brown (10YR 4/3) moist; moderate medium subangular blocky structure; slightly hard, friable, sticky and plastic; neutral; clear wavy boundary.

Bk1—21 to 28 inches; light olive brown (2.5Y 5/4) gravelly sandy clay loam, olive brown (2.5Y 4/4) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; 20 percent gravel; common fine irregularly shaped masses of lime; strongly effervescent; moderately alkaline; clear wavy boundary.

Bk2—28 to 42 inches; yellowish brown (10YR 5/4) loam, dark yellowish brown (10YR 4/4) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few fine irregularly shaped masses of lime; strongly effervescent; moderately alkaline; clear wavy boundary.

Bk3—42 to 60 inches; pale brown (10YR 6/3) loam, brown (10YR 5/3) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few fine irregularly shaped masses of lime; strongly effervescent; moderately alkaline.

The mollic epipedon is 7 to 15 inches thick. The content of rock fragments in the particle-size control section ranges from 0 to 10 percent.

The A horizon has hue of 10YR or 7.5YR.

The Bt and Bk horizons have hue of 2.5Y to 7.5YR.

Fluvaquents

Fluvaquents consist of deep, poorly drained and somewhat poorly drained soils on flood plains and first terraces. These soils formed in alluvium derived dominantly from shale and sandstone rock sources. Slope ranges from 0 to 3 percent. Elevation is 4,800 to 6,100 feet. Average annual precipitation is 9 to 16 inches, and average annual air temperature is 46 to 52 degrees F.

Reference pedon of Fluvaquents, 0 to 3 percent slopes, approximately 2,400 feet east and 500 feet south of the northwest corner of sec. 13, T. 10 S., R. 96 W.

A—0 to 2 inches; grayish brown (10YR 5/2) loam, dark brown (10YR 3/3) moist; moderate medium granular structure; slightly hard, very friable, slightly sticky and slightly plastic; slightly effervescent; moderately alkaline; abrupt wavy boundary.

C1—2 to 13 inches; very pale brown (10YR 7/3) sandy loam, brown (10YR 5/3) moist; common fine faint white (10YR 8/1) and few fine faint pink (7.5YR 7/4) mottles; massive; friable, nonsticky

and nonplastic; strongly effervescent; strongly alkaline; abrupt wavy boundary.

C2—13 to 32 inches; stratified, light yellowish brown (2.5Y 6/2) sandy loam and loamy sand, dark gray (5Y 4/1) moist; massive; soft, friable, nonsticky and nonplastic; slightly effervescent; strongly alkaline; clear smooth boundary.

C3—32 to 42 inches; gray (10YR 5/1) silty clay loam, dark gray (10YR 4/1) moist; massive; very hard, friable, sticky and plastic; strongly effervescent; moderately alkaline; clear wavy boundary.

C4—42 to 60 inches; stratified light brownish gray (10YR 6/2) gravelly loam to very gravelly loamy sand, dark grayish brown (10YR 4/2) moist; massive; soft or loose, very friable or loose, nonsticky and nonplastic to slightly plastic and plastic; as an average, about 0 to 5 percent cobbles, 25 to 30 percent gravel; slightly effervescent; slightly alkaline.

The water table is usually at a depth of 0 to 12 inches. Lime is at a depth of 0 to 10 inches. Some pedons have a buried A horizon, and some pedons do not have an A horizon.

The A horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 1 to 3. It is very fine sandy loam, fine sandy loam, silt loam, loam, or clay loam. Reaction is moderately alkaline or strongly alkaline.

The C horizon is stratified and varies widely in texture. The particle-size class ranges from sandy to fine-loamy. The content of rock fragments in the particle-size control section ranges from 0 to 25 percent. In some pedons the rock fragments occur as stratified lenses. Below the particle-size control section, and to a depth of 60 inches, the content of rock fragments ranges from 0 to 40 percent. Reaction is slightly alkaline to strongly alkaline.

Fughes Series

The Fughes series consists of deep, well drained soils on mesas and terraces. These soils formed in alluvium and colluvium derived from mixed sedimentary rocks. Slope ranges from 2 to 12 percent. Elevation is 6,800 to 7,400 feet. Average annual precipitation is 15 to 22 inches, and average annual air temperature is 40 to 45 degrees F.

These soils are classified as fine, montmorillonitic Pachic Argiborolls.

Typical pedon of Fughes clay loam, 2 to 6 percent slopes, approximately 400 feet south and 1,000 feet east of the northwest corner of sec. 23, T. 9 S., R. 94 W.

A—0 to 7 inches; dark grayish brown (10YR 4/2) clay loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure parting to moderate fine granular; slightly hard, friable, slightly sticky and slightly plastic; less than 5 percent gravel; neutral; clear wavy boundary.

AB—7 to 18 inches; dark grayish brown (10YR 4/2) clay loam, very dark grayish brown (10YR 3/2) moist; moderate coarse subangular blocky structure parting to moderate fine subangular blocky; hard, friable, sticky and plastic; less than 5 percent gravel; neutral; clear wavy boundary.

Bt1—18 to 27 inches; dark brown (7.5YR 4/4) silty clay loam, dark brown (7.5YR 4/2) moist; moderate medium angular blocky structure; very hard, firm, sticky and plastic; less than 5 percent gravel; neutral; clear wavy boundary.

Bt2—27 to 50 inches; dark brown (7.5YR 4/4) silty clay loam, dark brown (7.5YR 4/4) moist; moderate medium subangular blocky structure; very hard, firm, sticky and plastic; less than 5 percent gravel; neutral; clear wavy boundary.

C—50 to 62 inches; brown (7.5YR 5/4) silty clay loam, dark brown (10YR 4/2) moist; massive; very hard, friable, sticky and plastic; less than 5 percent gravel; neutral.

The mollic epipedon is 18 to 24 inches thick. The thickness of the solum ranges from 32 to 56 inches. The content of rock fragments in the particle-size control section is less than 5 percent.

The A horizon is neutral or slightly alkaline.

The Bt horizon has hue of 7.5YR or 10YR. It is clay loam or silty clay loam. The content of clay ranges from 35 to 40 percent. Reaction is neutral or slightly alkaline.

The C horizon has hue of 7.5YR or 10YR. Reaction is neutral or slightly alkaline.

Godding Series

The Godding series consists of deep, well drained soils on till plains. These soils formed in glacial deposits derived from basalt, sandstones, and shale. Slope ranges from 6 to 25 percent. Elevation is 7,000 to 8,200 feet. Average annual precipitation is 18 to 25 inches, and average annual air temperature is 41 to 44 degrees F.

These soils are classified as clayey-skeletal, montmorillonitic Pachic Argiborolls.

Typical pedon of Godding stony loam, 9 to 25 percent slopes, extremely bouldery, about 250 feet north and 1,000 feet east of the southwest corner of sec. 9, T. 11 S., R. 96 W. About 5 to 10 percent of the surface is covered with stones and boulders.

A—0 to 7 inches; dark grayish brown (10YR 4/2) stony loam, very dark brown (10YR 2/2) moist; moderate fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; 5 percent cobbles, 10 percent stones, 10 percent boulders; most of the rock fragments are on the surface; neutral; clear wavy boundary.

Bt1—7 to 10 inches; dark grayish brown (10YR 4/2) very stony clay loam, very dark brown (10YR 2/2) moist; strong fine subangular blocky structure; hard, friable, sticky and plastic; 15 percent gravel, 20 percent cobbles, 20 percent stones; neutral; clear wavy boundary.

Bt2—10 to 17 inches; dark grayish brown (10YR 4/2) very stony clay, very dark brown (10YR 2/2) moist; moderate medium prismatic structure parting to moderate medium angular blocks; extremely hard, firm, very sticky and very plastic; 15 percent gravel, 20 percent cobbles, 20 percent stones; neutral; clear wavy boundary.

Bt3—17 to 27 inches; brown (7.5YR 5/4) very stony clay, strong brown (7.5YR 4/6) moist; moderate medium prismatic structure parting to moderate medium angular blocks; extremely hard, very firm, very sticky and very plastic; clay films and organic stains on faces of peds; 15 percent gravel, 20 percent cobbles, 20 percent stones; neutral; clear wavy boundary.

Bt4—27 to 48 inches; light yellowish brown (10YR 6/4) very stony clay loam, dark yellowish brown (10YR 4/4) moist; moderate fine subangular blocky structure; hard, firm, sticky and plastic; thin patchy clay films and few organic stains on faces of peds; 15 percent gravel, 20 percent cobbles, 20 percent stones; neutral; gradual wavy boundary.

BC—48 to 60 inches; brown (10YR 5/3) very stony clay loam, dark yellowish brown (10YR 4/4) moist; weak very fine subangular blocky structure; hard, firm, sticky and plastic; 15 percent gravel, 20 percent cobbles, 20 percent stones; neutral.

The mollic epipedon is 16 to 25 inches thick. The thickness of the solum ranges from 40 to 60 inches. The content of rock fragments in the particle-size control section ranges from 40 to 65 percent.

The A horizon is 25 to 40 percent gravel and cobbles combined and 10 to 35 percent stones and boulders.

The Bt horizon is clay loam or clay modified by rock fragments. The content of clay ranges from 35 to 50 percent. The horizon is 25 to 40 percent gravel and cobbles combined and 15 to 35 percent stones and boulders.

The BC or C horizon is sandy clay loam or clay loam modified by rock fragments. The horizon is 35 to 50 percent gravel and cobbles combined and 25 to 40 percent stones and boulders.

Golime Series

The Golime series consists of deep, well drained soils on till plains. These soils formed in glacial deposits derived dominantly from basalt with a lesser influence from shale and sandstone. Slope ranges from 5 to 15 percent. Elevation is 6,200 to 7,200 feet. Average annual precipitation is 15 to 18 inches, and average annual air temperature is 44 to 45 degrees F.

These soils are classified as clayey-skeletal, montmorillonitic Pachic Argiborolls.

Typical pedon of Golime cobbly loam, 5 to 15 percent slopes, very bouldery, about 1,100 feet east and 1,900 feet north of the southwest corner of sec. 5, T. 11 S., R. 96 W. About 1 to 3 percent of the surface is covered with stones and boulders that are spaced 10 to 50 feet apart.

A—0 to 4 inches; grayish brown (10YR 5/2) cobbly loam, very dark grayish brown (10YR 3/2) moist; weak fine and medium granular structure; slightly hard, friable, slightly sticky and slightly plastic; 10 percent gravel, 10 percent cobbles, 5 percent stones; neutral; clear smooth boundary.

AB—4 to 10 inches; grayish brown (10YR 5/2) cobbly loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure parting to moderate fine subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; 10 percent gravel, 10 percent cobbles, 5 percent stones; slightly alkaline; clear wavy boundary.

Bt1—10 to 15 inches; brown (10YR 5/3) very cobbly clay loam, dark brown (10YR 3/3) moist; moderate coarse angular blocky structure parting to strong medium angular blocky; very hard, firm, sticky and plastic; 10 percent gravel, 15 percent cobbles, 10 percent stones; common very fine and few fine tubular pores; slightly alkaline; clear wavy boundary.

Bt2—15 to 22 inches; brown (10YR 5/3) very cobbly clay loam, dark brown (10YR 3/3) moist; moderate coarse subangular blocky structure parting to strong medium subangular blocky; very hard, friable, sticky and plastic; 10 percent gravel, 15 percent cobbles, 10 percent stones; common very fine and few fine tubular pores; slightly alkaline; clear wavy boundary.

Btk—22 to 34 inches; yellowish brown (10YR 5/4) very stony clay loam with few distinct white (10YR 8/2) specks and filaments of lime, brown (10YR 4/3) moist; moderate coarse subangular blocky

structure; very hard, friable, sticky and plastic; 15 percent gravel, 15 percent cobbles, 15 percent stones; common very fine and few fine tubular pores; noncalcareous in matrix, 5 percent calcium carbonate equivalent, slightly effervescent in segregations, calcareous in segregations; moderately alkaline; gradual wavy boundary.

Bk1—34 to 45 inches; pale brown (10YR 6/3) extremely cobbly sandy clay loam with common fine to large faint white (10YR 8/2) mottles, olive brown (2.5Y 4/4) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; 15 percent gravel, 35 percent cobbles, 15 percent stones; 8 percent calcium carbonate equivalent; slightly effervescent; moderately alkaline; abrupt wavy boundary.

Bk2—45 to 60 inches; light brownish gray (2.5Y 6/2) extremely stony sandy loam with many medium and large distinct white (10YR 8/2) spots of segregated lime, grayish brown (2.5Y 5/2) moist; massive; hard, friable, nonsticky and nonplastic; 15 percent gravel, 30 percent cobbles, 20 percent stones; very few roots; 15 percent calcium carbonate equivalent; violently effervescent; moderately alkaline.

The mollic epipedon is 16 to 24 inches thick. The thickness of the solum ranges from 30 to 50 inches. The content of rock fragments in the particle-size control section ranges from 35 to 50 percent. About one-third of the rock fragments consist of stones and boulders. The content of clay in the particle-size control section ranges from 35 to 45 percent. Lime is at a depth of 20 to 40 inches.

Grobutte Series

The Grobutte series consists of deep, well drained soils on steep hillsides and mountainsides. These soils formed in colluvium derived from mixed material. Slope ranges from 30 to 60 percent. Average annual precipitation is 16 to 18 inches, and average annual air temperature is 36 to 38 degrees F.

These soils are classified as loamy-skeletal, mixed (calcareous), frigid Ustic Torriorthents.

Typical pedon of Grobutte very channery loam, 30 to 60 percent slopes, about 800 feet south and 2,000 feet east of the northwest corner of sec. 13, T. 7 S., R. 102 W.

A—0 to 4 inches; grayish brown (10YR 5/2) very channery loam, dark grayish brown (10YR 4/2) moist; weak fine granular structure; slightly hard, very friable, slightly sticky and slightly plastic; few stones, 5 percent cobbles, 50 percent gravel and channers; slightly effervescent; moderately alkaline; clear wavy boundary.

C—4 to 60 inches; light gray (10YR 7/2) very channery loam, grayish brown (2.5Y 5/2) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; 55 percent gravel and channers, 5 percent cobbles; disseminated lime; violently effervescent; moderately alkaline.

The content of gravel, cobbles, and channers ranges from 35 to 75 percent.

The A and C horizons have hue of 2.5Y or 10YR. Reaction is moderately alkaline or strongly alkaline. The C horizon has many moderately thick coatings of calcium carbonate on the bottom of channers.

Haploborolls

Haploborolls consist of shallow to deep, well drained soils on steep mountain side slopes. These soils formed in residuum and colluvium derived dominantly from interbedded sandstone and shale. Slope ranges from 50 to 80 percent. Elevation is 7,700 to 8,200 feet. Average annual precipitation is 16 to 20 inches, and average annual air temperature is 40 to 45 degrees F.

Reference pedon of Haploborolls, in an area of Haploborolls-Rock outcrop complex, 50 to 80 percent slopes, approximately 2,500 feet south and 1,500 feet west of the northeast corner of sec. 26, T. 5 S., R. 104 W.

A1—0 to 6 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; moderate medium granular structure; slightly hard, friable, nonsticky and nonplastic; 5 percent gravel; neutral; clear smooth boundary.

A2—6 to 11 inches; dark grayish brown (10YR 4/2) gravelly sandy clay loam, dark brown (10YR 3/3) moist; weak medium subangular blocks parting to moderate fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; 10 percent gravel, 5 percent cobbles; neutral; clear smooth boundary.

Bw—11 to 22 inches; brown (10YR 5/3) very stony loam, brown (10YR 5/3) moist; weak coarse subangular blocky structure; slightly hard, friable, nonsticky and nonplastic; 20 percent gravel, 15 percent cobbles, 15 percent stones; strongly effervescent in spots; slightly alkaline; clear wavy boundary.

Bk—22 to 32 inches; very pale brown (10YR 7/3) very cobbly sandy clay loam, pale brown (10YR 6/3) moist; massive; slightly hard, friable, nonsticky and nonplastic; 25 percent gravel, 20 percent

cobbles, 10 percent stones; secondary calcium carbonate occurs as thin streaks and seams and as coatings on coarse fragments; violently effervescent; moderately alkaline; clear wavy boundary.

R—32 inches; calcareous sandstone.

Bedrock is at a depth of 10 to 60 inches. The mollic epipedon is 10 to 30 inches thick. The content of rock fragments in the particle-size control section ranges from 20 to 75 percent. The content of clay in the particle-size control section ranges from 20 to 25 percent. Reaction is neutral or slightly alkaline in the surface layer and slightly alkaline or moderately alkaline in the lower part of the subsoil.

Happle Series

The Happle series consists of deep, well drained soils on fans, toeslopes, and side slopes. These soils formed in colluvium and alluvium derived dominantly from the Green River shale formation. Slope ranges from 3 to 65 percent. Average annual precipitation is 12 to 15 inches, and average annual air temperature is 46 to 52 degrees F.

These soils are classified as loamy-skeletal, mixed (calcareous), mesic Ustic Torriorthents.

Typical pedon of Happle very channery sandy loam, 3 to 12 percent slopes, approximately 600 feet south and 700 feet west of the northeast corner of sec. 9, T. 8 S., R. 98 W.

A—0 to 7 inches; light gray (10YR 7/2) very channery sandy loam, light yellowish brown (10YR 6/4) moist; weak very fine granular structure parting to single grain; loose, nonsticky and nonplastic; 40 percent channers; violently effervescent; moderately alkaline; clear wavy boundary.

C1—7 to 14 inches; very pale brown (10YR 7/3) very channery sandy loam, light yellowish brown (2.5Y 6/4) moist; massive; loose, nonsticky and nonplastic; 45 percent channers; violently effervescent; moderately alkaline; clear wavy boundary.

C2—14 to 32 inches; pale yellow (2.5Y 7/4) very channery sandy clay loam, light yellowish brown (2.5Y 6/4) moist; massive; soft, very friable, nonsticky and slightly plastic; 55 percent channers; violently effervescent; moderately alkaline; clear wavy boundary.

C3—32 to 60 inches; light gray (2.5Y 7/2) extremely channery sandy loam, light olive brown (2.5Y 5/4) moist; massive; loose, nonsticky and nonplastic; 60 percent channers; strongly effervescent; moderately alkaline.

Hue is 10YR or 2.5Y. The content of rock fragments in the particle-size control section ranges from 35 to 75 percent. The content of clay ranges from 15 to 30 percent. Reaction is slightly alkaline or moderately alkaline throughout the profile.

Hesperus Series

The Hesperus series consists of deep, well drained soils on side slopes and toeslopes of foothills. These soils formed in residuum and colluvium derived dominantly from sandstone and shale. Slope ranges from 3 to 55 percent. Elevation is 6,200 to 8,500 feet. Average annual precipitation is 12 to 22 inches, and average annual air temperature is 40 to 45 degrees F.

These soils are classified as fine-loamy, mixed Pachic Argiborolls.

Typical pedon of Hesperus loam, in an area of Pagoda-Hesperus complex, 12 to 40 percent slopes, about 700 feet east and 300 feet north of the southwest corner of sec. 32, T. 9 S., R. 94 W.

A—0 to 4 inches; very dark gray (10YR 3/1) loam, black (10YR 2/1) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; neutral; abrupt smooth boundary.

BA—4 to 7 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; neutral; abrupt smooth boundary.

Bt1—7 to 17 inches; brown (10YR 4/3) clay loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; hard, firm, sticky and plastic; neutral; clear wavy boundary.

Bt2—17 to 24 inches; brown (10YR 4/3) clay loam, dark brown (10YR 4/3) moist; strong medium subangular blocky structure; hard, firm, sticky and plastic; common thin clay films on faces of peds; neutral; clear smooth boundary.

BC—24 to 37 inches; dark yellowish brown (10YR 4/4) clay loam, dark yellowish brown (10YR 4/4) moist; moderate coarse subangular blocky structure; very hard, very firm, sticky and plastic; slightly alkaline; clear smooth boundary.

C—37 to 60 inches; brown (10YR 4/3) clay loam, brown (10YR 4/3) moist; massive; hard, firm, sticky and plastic; neutral.

The thickness of the mollic epipedon ranges from 17 to more than 40 inches. The content of rock fragments in the particle-size control section ranges from 0 to 10 percent. The content of clay ranges from 20 to 35 percent in the particle-size control section.

Irigul Series

The Irigul series consists of shallow, well drained soils on convex crests and mountainsides. These soils formed in residuum derived from sandstone, siltstone, or hard shale. Slope ranges from 5 to 50 percent. Average annual precipitation is 18 to 22 inches, and average annual air temperature is 36 to 40 degrees F.

These soils are classified as loamy-skeletal, mixed Lithic Cryoborolls.

Typical pedon of Irigul channery loam, in an area of Irigul-Starman channery loams, 5 to 35 percent slopes, about 2,500 feet south and 1,000 feet east of the northwest corner of sec. 29, T. 5 S., R. 101 W.

A—0 to 6 inches; brown (10YR 5/3) channery loam, dark brown (10YR 3/3) moist; weak very fine granular structure; slightly hard, very friable, slightly sticky; 20 percent channers; neutral; clear smooth boundary.

Bw—6 to 13 inches; brown (7.5YR 5/4) very channery loam, dark brown (7.5YR 4/4) moist; weak fine subangular blocky structure; slightly hard, very friable, slightly sticky; 55 percent channers; neutral; clear wavy boundary.

R—13 inches; sandstone and hard shale bedrock.

Bedrock is at a depth of 4 to 20 inches. The content of rock fragments in the particle-size control section ranges from 35 to 70 percent.

The A horizon has hue of 2.5Y or 10YR.

The Bw horizon has hue of 2.5Y to 7.5YR.

Mesa Series

The Mesa series consists of deep, well drained soils on alluvial fans and benches. These soils formed in alluvium and residuum derived dominantly from sedimentary rock. Slope ranges from 3 to 12 percent. Average annual precipitation is 7 to 11 inches, and average annual air temperature is 50 to 53 degrees F.

The Mesa soils in this survey area are taxadjuncts because they have more clay in the particle-size control section than is defined as the range for the series. These soils are classified as fine, montmorillonitic, mesic Typic Haplargids.

Typical pedon of Mesa very fine sandy loam, in an area of Mesa-Avalon complex, 3 to 12 percent slopes, about 1,800 feet west and 300 feet south of the northeast corner of sec. 18, T. 8 S., R. 102 W.

A—0 to 3 inches; light brown (7.5YR 6/4) very fine sandy loam, brown (7.5YR 5/4) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; slightly alkaline; abrupt smooth boundary.

Bt—3 to 12 inches; brown (7.5YR 5/4) clay loam, dark brown (7.5YR 4/4) moist; moderate medium prismatic structure parting to strong medium angular blocky; slightly hard, friable, slightly sticky and slightly plastic; moderately alkaline; clear smooth boundary.

Btk1—12 to 17 inches; brown (7.5YR 5/4) clay loam, dark brown (7.5YR 4/4) moist; weak medium prismatic structure parting to strong medium angular blocky; slightly hard, friable, slightly sticky and slightly plastic; 20 percent soft masses of lime; common fine continuous pores; common thin clay films on faces of peds; strongly effervescent; moderately alkaline; clear smooth boundary.

Btk2—17 to 26 inches; light brown (7.5YR 6/4) clay loam, brown (7.5YR 5/4) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; 20 percent soft masses of lime; common thin clay films on faces of peds; violently effervescent; moderately alkaline; clear wavy boundary.

Bky—26 to 38 inches; pink (7.5YR 7/4) very gravelly clay loam, pink (7.5YR 7/4) moist; massive; soft, very friable, slightly sticky and slightly plastic; 24 percent gravel, 5 percent cobbles, 10 percent stones; disseminated lime; violently effervescent; moderately alkaline; clear smooth boundary.

Ck—38 to 60 inches; light brown (7.5YR 6/4) very gravelly loam, brown (7.5YR 5/4) moist; massive; soft, friable, slightly sticky and slightly plastic; 24 percent gravel, 5 percent cobbles, 10 percent stones; strongly effervescent; moderately alkaline.

Lime is at a depth of 0 to 14 inches.

The A horizon has hue of 10YR or 7.5YR.

The Bt and Btk horizons have hue of 10YR or 7.5YR. The texture is loam or clay loam.

The Bk and Ck horizons have hue of 10YR or 7.5YR. The calcium carbonate equivalent is 15 to 40 percent.

Northwater Series

The Northwater series consists of deep, well drained soils on mountainsides. These soils formed in residuum and colluvium derived from sedimentary rock. Slope ranges from 5 to 65 percent. Average annual precipitation is 18 to 30 inches, and average annual air temperature is 36 to 40 degrees F.

These soils are classified as loamy-skeletal, mixed Cryic Pachic Paleborolls.

Typical pedon of Northwater loam, in an area of Northwater-Adel complex, 5 to 50 percent slopes, about 700 feet east and 600 feet north of the southwest corner of sec. 11, T. 6 S., R. 97 W.

A1—0 to 14 inches; dark grayish brown (10YR 4/2) loam, very dark brown (10YR 2/2) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; 5 percent channers; neutral; gradual smooth boundary.

A2—14 to 28 inches; dark grayish brown (10YR 4/2) loam, very dark brown (10YR 2/2) moist; weak medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; 5 percent channers; neutral; abrupt wavy boundary.

Bt—28 to 48 inches; yellowish brown (10YR 5/4) very channery loam, yellowish brown (10YR 5/4) moist; moderate fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; 40 percent channers, 20 percent angular cobbles; few thin clay films; neutral; gradual wavy boundary.

C—48 to 60 inches; yellowish brown (10YR 5/4) extremely channery loam, yellowish brown (10YR 5/4) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; 60 percent channers, 20 percent angular cobbles; neutral.

The mollic epipedon is 20 to 35 inches thick. Depth to the top of the argillic horizon is 24 inches or more. Hue is 7.5YR to 2.5Y throughout the profile.

Pagoda Series

The Pagoda series consists of deep, well drained soils on benches and mountaintops. These soils formed in colluvium derived dominantly from shale. Slope ranges from 3 to 55 percent. Average annual precipitation is 15 to 22 inches, and average annual air temperature is 40 to 45 degrees F.

These soils are classified as fine, montmorillonitic Pachic Argiborolls.

Typical pedon of Pagoda clay loam, in an area of Hesperus-Empedrado, moist-Pagoda complex, 5 to 35 percent slopes, about 800 feet north and 1,000 feet west of the southeast corner of sec. 13, T. 7 S., R. 102 W.

A—0 to 6 inches; dark grayish brown (10YR 4/2) clay loam, very dark grayish brown (10YR 3/2) moist; strong very fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; neutral; clear wavy boundary.

BA—6 to 10 inches; very dark grayish brown (10YR 3/2) clay loam, very dark brown (10YR 2/2) moist; moderate fine subangular blocky structure; hard, friable, sticky and plastic; neutral; clear wavy boundary.

Bt1—10 to 17 inches; brown (10YR 5/3) clay loam, very dark grayish brown (10YR 3/2) moist; moderate fine subangular blocky structure; very hard, firm, very sticky and very plastic; neutral; abrupt wavy boundary.

Bt2—17 to 27 inches; brown (10YR 5/3) clay, dark grayish brown (10YR 4/2) moist; moderate fine angular blocky structure; very hard, firm, very sticky and very plastic; neutral; gradual wavy boundary.

Bk1—27 to 40 inches; brown (10YR 5/3) clay, dark brown (10YR 4/3) moist; moderate medium angular blocky structure; very hard, firm, very sticky and very plastic; few fine spots of lime; violently effervescent; moderately alkaline; gradual wavy boundary.

Bk2—40 to 60 inches; brown (10YR 5/3) clay loam, dark brown (10YR 4/3) moist; massive; very hard, firm, very sticky and very plastic; few fine spots of lime; violently effervescent; moderately alkaline.

The mollic epipedon is 16 to 28 inches thick.

The Bt horizon has hue of 2.5Y or 10YR.

Panitchen Series

The Panitchen series consists of deep, well drained soils on terraces and flood plains. These soils formed in alluvium. Slope ranges from 1 to 6 percent. Average annual precipitation is 12 to 16 inches, and average annual air temperature is 48 to 52 degrees F.

These soils are classified as fine-loamy, mixed (calcareous), mesic Ustic Torrifluvents.

Typical pedon of Panitchen loam, 1 to 6 percent slopes, about 1,000 feet south and 800 feet west of the northeast corner of sec. 7, T. 8 S., R. 98 W.

A—0 to 7 inches; light gray (10YR 7/2) loam, brown (10YR 4/3) moist; moderate fine subangular blocky structure; slightly hard, friable, nonsticky and slightly plastic; strongly effervescent; moderately alkaline; clear smooth boundary.

C1—7 to 25 inches; pale brown (10YR 6/3), stratified gravelly loam, brown (10YR 4/3) moist; weak fine subangular blocky structure; slightly hard, friable, nonsticky and slightly plastic; 16 percent fine gravel; lime occurs as seams and streaks; strongly effervescent; moderately alkaline; clear wavy boundary.

C2—25 to 29 inches; pale brown (10YR 6/3) gravelly clay loam, brown (10YR 5/3) moist; weak fine granular structure; slightly hard, friable, slightly

sticky and slightly plastic; 20 percent fine gravel; lime occurs as seams and streaks; violently effervescent; moderately alkaline; clear wavy boundary.

2C3—29 to 60 inches; light yellowish brown (10YR 6/4) loam with thin strata of sandy loam, fine sandy loam, and clay loam, brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and slightly plastic; lime occurs as seams and streaks; violently effervescent; moderately alkaline.

The content of rock fragments in the particle-size control section ranges from 0 to 15 percent on a weighted average basis. Hue is 10YR or 2.5Y throughout the profile. Reaction is moderately alkaline or strongly alkaline.

Parachute Series

The Parachute series consists of moderately deep, well drained soils on mountain ridges and mountainsides. These soils formed in residuum derived dominantly from sedimentary rock. Slope ranges from 5 to 50 percent. Average annual precipitation is 18 to 22 inches, and average annual air temperature is 36 to 40 degrees F.

These soils are classified as loamy-skeletal, mixed Typic Cryoborolls.

Typical pedon of Parachute loam, in an area of Parachute-Rhone loams, 5 to 30 percent slopes, about 1,200 feet east and 1,100 feet south of the northwest corner of sec. 25, T. 5 S., R. 102 W.

A—0 to 10 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; slightly hard, very friable, nonsticky and nonplastic; 10 percent gravel; neutral; clear smooth boundary.

Bw1—10 to 16 inches; brown (10YR 5/3) very channery loam, dark brown (10YR 4/3) moist; weak fine subangular blocky structure; hard, very friable, slightly sticky and slightly plastic; 40 percent channers; neutral; clear wavy boundary.

Bw2—16 to 25 inches; brown (10YR 5/3) very channery loam, dark brown (10YR 4/3) moist; weak very fine subangular blocky structure; hard, very friable, slightly sticky and slightly plastic; 55 percent channers; neutral; clear wavy boundary.

R—25 inches; rippable, fractured siltstone.

Bedrock is at a depth of 20 to 40 inches. The content of rock fragments ranges from 35 to 85 percent. Hue is 7.5YR to 2.5Y.

Peninsula Series

The Peninsula series consists of deep, well drained soils on valley terraces. These soils formed in glacially modified alluvium derived from mixed basalt, shale, and sandstone. Slope ranges from 3 to 9 percent. Elevation is 6,200 to 6,800 feet. Average annual precipitation is 15 to 19 inches, and average annual air temperature is 42 to 45 degrees F.

These soils are classified as fine, montmorillonitic Typic Argiborolls.

Typical pedon of Peninsula loam, 3 to 9 percent slopes, 2,040 feet north and 1,940 feet east of the southwest corner of sec. 35, T. 9 S., R. 95 W.

Ap—0 to 4 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; moderate fine and medium granular structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine and few medium roots; many very fine and few fine interstitial pores; neutral; clear wavy boundary.

Bt1—4 to 10 inches; reddish brown (5YR 4/3) clay loam, dark reddish brown (5YR 3/3) moist; moderate fine subangular blocky structure parting to strong fine subangular blocks; hard, friable, sticky and plastic; many very fine, common fine, and few medium roots; many very fine and few fine interstitial pores; thin patchy clay films on faces of peds and many thin clay films lining pores; slightly alkaline; abrupt smooth boundary.

Bt2—10 to 19 inches; reddish brown (5YR 5/4) clay loam, reddish brown (5YR 4/4) moist; moderate medium prismatic structure parting to strong coarse angular blocks; very hard, firm, sticky and plastic; common very fine roots; common very fine vertical tubular pores; continuous thin and moderately thick clay films on faces of peds and continuous moderately thick clay films lining pores; slightly alkaline; clear wavy boundary.

Btk—19 to 28 inches; brown (7.5YR 5/4) clay loam, strong brown (7.5YR 4/6) moist; moderate coarse subangular blocky structure parting to strong medium blocky; common very fine roots; common very fine vertical tubular pores; very hard, friable, sticky and plastic; few thin clay films on faces of peds; 5 percent cobbles; common fine and medium distinct pinkish white (7.5YR 8/2) specks and spots of lime; 6 percent calcium carbonate equivalent; strongly effervescent; moderately alkaline; gradual wavy boundary.

Bk1—28 to 40 inches; pinkish white (7.5YR 8/2) loam, light brown (7.5YR 6/4) moist; massive; hard, friable, slightly sticky and slightly plastic; few

roots; common very fine random pores; 5 percent cobbles; 30 percent calcium carbonate equivalent; violently effervescent; moderately alkaline; gradual wavy boundary.

Bk2—40 to 53 inches; white (10YR 8/2) heavy loam, very pale brown (10YR 7/4) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few roots; few very fine random pores; 33 percent calcium carbonate equivalent; violently effervescent; moderately alkaline; gradual wavy boundary.

C—53 to 62 inches; very pale brown (10YR 7/3) loam with white (10YR 8/2) coatings, streaks, and spots, yellowish brown (10YR 5/4) moist; massive; slightly hard, very friable, nonsticky and nonplastic; very few roots; common very fine random pores; common medium rounded concretions of lime; 9 percent calcium carbonate equivalent; strongly effervescent in the matrix and violently effervescent in limy masses and coatings; moderately alkaline.

The mollic epipedon is 7 to 16 inches thick. The thickness of the solum ranges from 16 to 30 inches. Secondary lime is at a depth of 16 to 24 inches. The content of rock fragments in the particle-size control section ranges from 0 to 15 percent.

The Ap horizon has hue of 7.5YR or 10YR.

The Bt horizon has hue of 5YR or 7.5YR. It is clay loam or silty clay loam. The content of clay ranges from 35 to 40 percent. Reaction is neutral or slightly alkaline. The content of rock fragments ranges from 0 to 20 percent. The rock fragments are mostly stone and cobble size.

Persayo Series

The Persayo series consists of shallow and well drained soils on upland hills. These soils formed in residuum derived from shale. Slope ranges from 3 to 25 percent. Average annual precipitation is 7 to 10 inches, and average annual air temperature is 47 to 52 degrees F.

These soils are classified as loamy, mixed (calcareous), mesic, shallow Typic Torriorthents.

Typical pedon of Persayo silty clay loam, 3 to 25 percent slopes, about 1,200 feet south and 400 feet west of the northeast corner of sec. 17, T. 8 S., R. 102 W.

A—0 to 3 inches; light brownish gray (2.5Y 6/2) silty clay loam, dark grayish brown (2.5Y 4/2) moist; moderate fine granular structure; soft, very friable, slightly sticky and slightly plastic; strongly effervescent; moderately alkaline; abrupt wavy boundary.

By—3 to 8 inches; light brownish gray (2.5Y 6/2) silty clay loam, grayish brown (2.5Y 5/2) moist; weak medium subangular blocky structure; slightly hard, firm, slightly sticky and slightly plastic; 5 percent small nodules of gypsum; slightly effervescent; moderately alkaline; clear wavy boundary.

Cy—8 to 15 inches; light gray (2.5Y 7/2) silty clay loam, grayish brown (2.5Y 5/2) moist; massive; slightly hard, firm, slightly sticky and slightly plastic; 9 percent medium nodules of gypsum; slightly effervescent; slightly alkaline; clear wavy boundary.

Cr—15 inches; weathered shale.

Paralithic contact is at a depth of 10 to 20 inches. Hue is 10YR to 5Y. The content of clay ranges from 20 to 35 percent. Reaction is slightly alkaline to strongly alkaline.

Rabbitex Series

The Rabbitex series consists of deep, well drained soils on mountain side slopes and ridges. These soils formed in residuum and colluvium derived from the Wasatch Formation, siltstone, and sandstone. Slope ranges from 12 to 65 percent. Average annual precipitation is 14 to 16 inches, and average annual air temperature is 40 to 45 degrees F.

These soils are classified as fine-loamy, mixed Typic Calciborolls.

Typical pedon of Rabbitex loam, in an area of Wrayha-Veatch-Rabbitex complex, 12 to 45 percent slopes, about 2,000 feet south and 2,000 feet west of the northeast corner of sec. 22, T. 8 S., R. 99 W.

A—0 to 7 inches; brown (10YR 5/3) loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; slightly hard, very friable, nonsticky and nonplastic; 5 percent gravel; 13 percent calcium carbonate equivalent; slightly effervescent; slightly alkaline; clear smooth boundary.

Bk1—7 to 15 inches; light gray (10YR 7/2) loam, brown (10YR 5/3) moist; moderate medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; 10 percent channers; disseminated lime; strongly effervescent; 16 percent calcium carbonate equivalent; moderately alkaline; clear smooth boundary.

Bk2—15 to 25 inches; light gray (10YR 7/2) channery loam, pale brown (10YR 6/3) moist; massive; hard, friable, nonsticky and slightly plastic; 15

percent channers; disseminated lime; strongly effervescent; 17 percent calcium carbonate equivalent; moderately alkaline; clear smooth boundary.

Bk3—25 to 60 inches; light gray (10YR 7/2) channery loam, brown (10YR 5/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; 20 percent channers; 23 percent calcium carbonate equivalent; disseminated lime; strongly effervescent; moderately alkaline.

The content of clay ranges from 18 to 27 percent. Secondary lime is at a depth of 7 to 28 inches. The content of rock fragments in the particle-size control section ranges from 15 to 25 percent. Hue is 10YR or 2.5Y throughout the profile.

The Bk horizon is loam or sandy clay loam in the fine-earth fraction. Reaction is moderately alkaline or strongly alkaline.

Redcreek Series

The Redcreek series consists of shallow, well drained soils on mountainsides and ridges. These soils formed in residuum derived dominantly from calcareous sandstone. Slope ranges from 3 to 30 percent. Average annual precipitation is 12 to 15 inches, and average annual air temperature is 40 to 45 degrees F.

These soils are classified as loamy, mixed (calcareous), frigid Lithic Ustic Torriorthents.

Typical pedon of Redcreek sandy loam, in an area of Redcreek-Rentsac complex, 5 to 40 percent slopes, in an unsectionalized area, projected to be approximately 600 feet west and 2,100 feet north of the southeast corner of sec. 18, T. 7 S., R. 103 W.

A—0 to 4 inches; brown (7.5YR 5/4) sandy loam, dark brown (7.5YR 4/4) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; strongly effervescent; slightly alkaline; clear smooth boundary.

AC—4 to 11 inches; brown (7.5YR 5/4) sandy loam, dark brown (7.5YR 4/2) moist; weak medium subangular blocky structure parting to weak fine granular; soft, friable, nonsticky and nonplastic; strongly effervescent; moderately alkaline; clear wavy boundary.

C—11 to 16 inches; very pale brown (10YR 7/3) channery sandy loam, light yellowish brown (10YR 6/4) moist; massive; slightly hard, friable, nonsticky and nonplastic; strongly effervescent; moderately alkaline; clear wavy boundary.

R—16 inches; hard, calcareous sandstone.

Bedrock is at a depth of 10 to 20 inches. Hue is 10YR or 7.5YR.

Rentsac Series

The Rentsac series consists of shallow, well drained soils on ridges, foothills, and entrenched upland breaks. These soils formed in residuum derived dominantly from calcareous sandstone. Slope ranges from 5 to 40 percent. Average annual precipitation is 12 to 15 inches, and average annual air temperature is 42 to 45 degrees F.

These soils are classified as loamy-skeletal, mixed (calcareous), frigid Lithic Ustic Torriorthents.

Typical pedon of Rentsac channery loam, in an area of Redcreek-Rentsac complex, 5 to 40 percent slopes, in an unsectionalized area, projected to be approximately 1,200 feet west and 2,500 feet north of the southeast corner of sec. 18, T. 7 S., R. 103 W.

A—0 to 3 inches; grayish brown (10YR 5/2) channery loam, dark grayish brown (10YR 4/2) moist; weak fine granular structure; loose, very friable, slightly sticky and slightly plastic; 20 percent channers; strongly effervescent; moderately alkaline; clear wavy boundary.

AC—3 to 6 inches; pale yellow (2.5Y 7/4) channery loam, light olive brown (2.5Y 5/4) moist; weak fine granular structure; soft, very friable, slightly sticky and slightly plastic; 25 percent channers; strongly effervescent; moderately alkaline; gradual wavy boundary.

C—6 to 19 inches; pale yellow (2.5Y 7/4) very channery loam, light olive brown (2.5Y 5/4) moist; massive; soft, very friable, slightly sticky and slightly plastic; 40 percent channers, 5 percent flagstones; strongly effervescent; moderately alkaline; clear wavy boundary.

R—19 inches; weathered, calcareous sandstone.

Bedrock is at a depth of 10 to 20 inches. The content of clay ranges from 7 to 18 percent. Hue is 2.5Y to 7.5YR.

Rhone Series

The Rhone series consists of deep, well drained soils on upland ridges and mountainsides. These soils formed in residuum and colluvium derived dominantly from sedimentary rock. Slope ranges from 5 to 50 percent. Average annual precipitation is 18 to 22 inches, and average annual air temperature is 36 to 40 degrees F.

These soils are classified as fine-loamy, mixed Pachic Cryoborolls.

Typical pedon of Rhone loam, in an area of Parachute-Irigul-Rhone association, 25 to 50 percent slopes, about 400 feet east and 700 feet south of the northwest corner of sec. 24, T. 6 S., R. 97 W.

A1—0 to 10 inches; very dark grayish brown (10YR 3/2) loam, very dark brown (10YR 2/2) moist; weak fine granular structure; slightly hard, very friable, nonsticky and nonplastic; 10 percent gravel; neutral; gradual smooth boundary.

A2—10 to 39 inches; dark grayish brown (10YR 4/2) channery loam, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure; hard, very friable, slightly sticky and slightly plastic; 20 percent channers; neutral; gradual wavy boundary.

Bw—39 to 55 inches; brown (10YR 5/3) very channery loam, dark brown (10YR 4/3) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; 5 percent cobbles, 55 percent channers; neutral; abrupt smooth boundary.

R—55 inches; rippable, fractured siltstone.

The mollic epipedon is 16 to 40 inches thick.

The A and Bw horizons have hue of 10YR or 7.5YR.

Shawa Series

The Shawa series consists of deep, well drained soils on benches. These soils formed in alluvium and colluvium derived dominantly from the Green River shale formation. Slope ranges from 3 to 20 percent. Average annual precipitation is 12 to 18 inches, and average annual air temperature is 40 to 45 degrees F.

These soils are classified as fine-loamy, mixed Pachic Haploborolls.

Typical pedon of Shawa loam, 3 to 20 percent slopes, about 2,200 feet north and 300 feet east of the southwest corner of sec. 25, T. 8 S., R. 99 W.

A1—0 to 3 inches; dark brown (10YR 4/3) loam, very dark brown (10YR 2/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; neutral; clear smooth boundary.

A2—3 to 20 inches; brown (10YR 5/3) loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; slightly hard, friable, nonsticky and slightly plastic; slightly alkaline; clear smooth boundary.

Bw—20 to 32 inches; brown (10YR 5/3) loam, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure; hard, friable, nonsticky and slightly plastic; slightly alkaline; clear wavy boundary.

Bk1—32 to 44 inches; brown (10YR 5/3) loam, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure; hard, friable, nonsticky and slightly plastic; disseminated lime; strongly effervescent; moderately alkaline; clear wavy boundary.

Bk2—44 to 51 inches; brown (10YR 5/3) loam, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure; slightly hard, friable, nonsticky and slightly plastic; disseminated lime; strongly effervescent; moderately alkaline; clear smooth boundary.

C—51 to 60 inches; brown (10YR 5/3) loam, dark brown (10YR 3/3) moist; weak fine subangular blocky structure; slightly hard, friable, nonsticky and slightly plastic; 5 percent gravel; strongly effervescent; moderately alkaline.

The content of rock fragments in the particle-size control section ranges from 0 to 5 percent. Lime is at a depth of 20 to 32 inches. Reaction is neutral to moderately alkaline throughout the profile. Hue is 10YR or 2.5Y.

Silas Series

The Silas series consists of deep, moderately well drained soils on alluvial valley floors. These soils formed in alluvium derived from mixed sedimentary rocks. Slope ranges from 1 to 12 percent. Elevation is 7,800 to 8,400 feet. Average annual precipitation is 20 to 25 inches, and average annual air temperature is 36 to 40 degrees F.

These soils are classified as fine-loamy, mixed Cumulic Cryoborolls.

Typical pedon of Silas loam, 1 to 12 percent slopes, about 2,000 feet west and 2,000 feet north of the southeast corner of sec. 33, T. 4 S., R. 96 W.

A1—0 to 8 inches; dark grayish brown (10YR 4/2) loam, very dark gray (10YR 3/1) moist; moderate medium granular structure; soft, very friable, nonsticky and slightly plastic; 10 percent channers; neutral; clear smooth boundary.

A2—8 to 18 inches; dark grayish brown (10YR 4/2) loam, very dark gray (10YR 3/1) moist; weak coarse subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; 10 percent channers; neutral; clear wavy boundary.

C1—18 to 45 inches; dark grayish brown (10YR 4/2)

clay loam, very dark grayish brown (10YR 3/2) moist; massive; soft, very friable, sticky and slightly plastic; 10 percent channers; neutral; gradual smooth boundary.

C2—45 to 60 inches; grayish brown (10YR 5/2) clay loam, very dark grayish brown (10YR 3/2) moist; massive; soft, very friable, slightly sticky and slightly plastic; 10 percent channers; neutral.

The mollic epipedon is 36 to 60 inches thick. The content of rock fragments in the particle-size control section ranges from 0 to 15 percent. Hue is 7.5YR to 2.5Y throughout the profile.

Skisams Series

The Skisams series consists of shallow, well drained soils on basalt flows. These soils formed in eolian material derived dominantly from mixed sources. Slope ranges from 1 to 10 percent. Elevation is 9,900 to 10,050 feet. Average annual precipitation is 25 to 30 inches, and average annual air temperature is 36 to 40 degrees F.

These soils are classified as loamy, mixed Lithic Cryoborolls.

Typical pedon of Skisams loam, in an area of Castino-Skisams-Winnemucca loams, 1 to 10 percent slopes, stony, about 700 feet north and 2,200 feet west of the southeast corner of sec. 35, T. 11 S., R. 97 W. About 0.01 to 0.1 percent of the surface is covered with stones.

A1—0 to 7 inches; dark brown (10YR 4/3) loam, very dark brown (10YR 2/2) moist; weak fine subangular blocky structure parting to moderate fine granular; soft, very friable, nonsticky and nonplastic; neutral; clear wavy boundary.

A2—7 to 15 inches; brown (10YR 5/3) loam, very dark brown (10YR 2/2) moist; weak medium subangular blocky structure parting to moderate medium granular; soft, very friable, nonsticky and nonplastic; neutral; clear wavy boundary.

Bw—15 to 19 inches; pale brown (10YR 6/3) gravelly loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few thin clay skins in pores; 10 percent gravel, 5 percent cobbles; neutral; abrupt wavy boundary.

R—19 inches; basalt.

Bedrock is at a depth of 5 to 19 inches. The content of clay ranges from 18 to 27 percent. Hue is 10YR or 7.5YR.

Starman Series

The Starman series consists of shallow, well drained soils on ridgetops. These soils formed in residuum derived from sandstone and hard shale. Slope ranges from 5 to 35 percent. Elevation is 7,800 to 8,400 feet. Average annual precipitation is 18 to 22 inches, and average annual air temperature is 36 to 40 degrees F.

These soils are classified as loamy-skeletal, mixed (calcareous) Lithic Cryorthents.

Typical pedon of Starman channery loam, in an area of Irigul-Starman channery loams, 5 to 35 percent slopes, about 1,800 feet west and 2,000 feet north of the southeast corner of sec. 22, T. 4 S., R. 97 W.

A1—0 to 1 inch; pale brown (10YR 6/3) channery loam, dark brown (10YR 3/3) moist; weak fine granular structure; slightly hard, very friable, nonsticky and nonplastic; 20 percent channers; slightly effervescent; slightly alkaline; abrupt wavy boundary.

A2—1 to 6 inches; brown (10YR 5/3) very channery loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; 45 percent channers; slightly effervescent; moderately alkaline; clear wavy boundary.

C—6 to 11 inches; light yellowish brown (10YR 6/4) extremely channery loam, brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; 75 percent channers; strongly effervescent; moderately alkaline; abrupt wavy boundary.

R—11 inches; sandstone.

Bedrock is at a depth of 8 to 20 inches.

Sunup Series

The Sunup series consists of shallow, well drained soils on mountain side slopes and ridges. These soils formed in residuum and colluvium derived from the Wasatch Formation, multicolored shale, and siltstone or sandstone. Slope ranges from 10 to 40 percent. Average annual precipitation is 12 to 14 inches, and average annual air temperature is 46 to 52 degrees F.

These soils are classified as loamy-skeletal, mixed (calcareous), mesic Lithic Ustic Torriorthents.

Typical pedon of Sunup gravelly loam, in an area of Biedsaw-Sunup gravelly loams, 10 to 40 percent

slopes, about 1,800 feet north and 1,000 feet east of the southwest corner of sec. 13, T. 8 S., R. 98 W.

A—0 to 4 inches; brown (10YR 5/3) gravelly loam, dark yellowish brown (10YR 4/4) moist; weak fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; 20 percent gravel, 5 percent cobbles, 5 percent stones; slightly effervescent; slightly alkaline; clear wavy boundary.

C—4 to 11 inches; brown (10YR 5/3) very gravelly loam, dark grayish brown (10YR 4/2) moist; weak fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; 20 percent gravel, 10 percent cobbles, 10 percent stones; violently effervescent; moderately alkaline; abrupt wavy boundary.

R—11 inches; sandstone.

Bedrock is at a depth of 10 to 20 inches. The content of rock fragments in the particle-size control section ranges from 35 to 75 percent. The content of clay ranges from 18 to 27 percent.

Torrifluvents

Torrifluvents consist of deep, well drained soils on alluvial fans and alluvial valley floors. These soils formed in alluvium derived from mixed sources. Slope ranges from 0 to 2 percent. Elevation is 5,100 to 6,500 feet. Average annual precipitation is 7 to 16 inches, and average annual air temperature is 40 to 52 degrees F.

Reference pedon of Torrifluvents, in an area of Torrifluvents-Gullied land complex, 0 to 2 percent slopes, approximately 900 feet west and 2,100 feet north of the southeast corner of sec. 16, T. 7 S., R. 101 W.

A—0 to 6 inches; grayish brown (2.5Y 5/2) loam, dark grayish brown (2.5Y 4/2) moist; weak fine granular structure; soft, very friable, slightly sticky and slightly plastic; slightly effervescent; slightly alkaline; clear wavy boundary.

C—6 to 21 inches; light brownish gray (2.5Y 6/2), stratified sandy loam, grayish brown (2.5Y 5/2) moist; massive; soft, very friable, nonsticky and nonplastic; bedding planes evident; strongly effervescent; slightly alkaline; clear smooth boundary.

2Ab—21 to 31 inches; grayish brown (2.5Y 5/2) light clay loam, dark grayish brown (2.5Y 4/2) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; strongly effervescent; slightly alkaline; clear smooth boundary.

2Bw—31 to 42 inches; pale brown (10YR 6/3) loam, brown (10YR 5/3) moist; weak coarse prismatic structure; slightly hard, friable, slightly sticky and slightly plastic; strongly effervescent; moderately alkaline; abrupt wavy boundary.

2C—42 to 60 inches; light brownish gray (2.5Y 6/2) sandy loam, grayish brown (2.5Y 5/2) moist; massive; slightly hard, friable, nonsticky and nonplastic; strongly effervescent; moderately alkaline.

The content of rock fragments in the particle-size control section ranges from 0 to 35 percent. The rock fragments are predominantly gravel and small channers occurring only as lenses in the soil. The content of clay ranges from 7 to 30 percent throughout the profile. Hue is 7.5YR to 2.5Y. Reaction is slightly alkaline or moderately alkaline.

Torriorthents

Torriorthents consist of very shallow to deep, well drained soils on side slopes of foothills and mountains. These soils formed in mixed colluvium and residuum derived from mixed sources. Slope ranges from 35 to 90 percent. Elevation is 5,100 to 8,500 feet. Average annual precipitation is 9 to 20 inches, and average annual air temperature is 42 to 52 degrees F.

Reference pedon of Torriorthents, in an area of Torriorthents, cool-Rock outcrop complex, 35 to 90 percent slopes, approximately 300 feet south and 1,100 feet west of the northeast corner of sec. 36, T. 7 S., R. 102 W.

A—0 to 2 inches; pale brown (10YR 6/3) channery loam, brown (10YR 5/3) moist; moderate medium granular structure; soft, very friable, slightly sticky and slightly plastic; 15 percent channers, 10 percent cobbles; strongly effervescent; slightly alkaline; clear smooth boundary.

AC—2 to 6 inches; brown (10YR 5/3) very channery loam, brown (10YR 4/3) moist; massive; soft, very friable, slightly sticky and slightly plastic; 20 percent channers, 10 percent angular cobbles; strongly effervescent; moderately alkaline; gradual smooth boundary.

Ck—6 to 13 inches; very pale brown (10YR 7/3) very channery loam, brown (10YR 5/3) moist; massive; soft, very friable, slightly sticky and slightly plastic; 30 percent channers, 15 percent cobbles; disseminated lime; strongly effervescent; moderately alkaline; abrupt smooth boundary.

R—13 inches; hard, fractured sandstone.

Bedrock is at a depth of 4 to 60 inches. The content of rock fragments in the particle-size control section ranges from 15 to 75 percent. Hue is 5Y to 5YR throughout the profile. Reaction is slightly alkaline or moderately alkaline.

Tosca Series

The Tosca series consists of deep, well drained soils on mountain side slopes. These soils formed in colluvium derived from Green River shale. Slope ranges from 25 to 80 percent. Average annual precipitation is 16 to 20 inches, and average annual air temperature is 40 to 46 degrees F.

These soils are classified as loamy-skeletal, mixed Typic Calciborolls.

Typical pedon of Tosca channery loam, 25 to 80 percent slopes, about 250 feet south and 1,875 feet east of the northwest corner of sec. 14, T. 6 S., R. 98 W.

A1—0 to 8 inches; dark grayish brown (10YR 4/2) channery loam, very dark grayish brown (10YR 3/2) moist; weak very fine granular structure; soft, very friable, nonsticky and slightly plastic; 30 percent channers; strongly effervescent; slightly alkaline; clear wavy boundary.

A2—8 to 15 inches; brown (10YR 4/3) very channery loam, dark brown (10YR 3/3) moist; weak very fine granular structure; soft, very friable, nonsticky and slightly plastic; 40 percent channers; violently effervescent; moderately alkaline; clear wavy boundary.

Bk1—15 to 24 inches; brown (10YR 5/3) very channery loam, dark grayish brown (10YR 4/2) moist; massive; slightly hard, friable, nonsticky and slightly plastic; 40 percent channers; violently effervescent; moderately alkaline; clear wavy boundary.

Bk2—24 to 46 inches; very pale brown (10YR 7/3) very channery loam, light yellowish brown (10YR 6/4) moist; massive; slightly hard, friable, nonsticky and slightly plastic; 45 percent channers; 30 percent calcium carbonate equivalent; disseminated lime; violently effervescent; moderately alkaline; clear wavy boundary.

Bk3—46 to 60 inches; light yellowish brown (10YR 6/4) very channery loam, yellowish brown (10YR 5/4) moist; massive; slightly hard, friable, nonsticky and slightly plastic; 36 percent channers; 17 percent calcium carbonate equivalent; disseminated lime; violently effervescent; strongly alkaline.

Secondary lime is at a minimum depth of 8 to 24 inches. The mollic epipedon is 9 to 15 inches thick. The content of clay ranges from 12 to 18 percent in the particle-size control section. The content of rock fragments in the particle-size control section ranges from 35 to 70 percent. The size and content of the rock fragments increase with increasing depth. Hue is 10YR or 2.5Y throughout the profile. The calcium carbonate equivalent ranges from 15 to 36 percent.

Trail Series

The Trail series consists of deep, somewhat excessively drained soils on flood plains and low terraces. These soils formed in alluvium. Slope ranges from 1 to 5 percent. Average annual precipitation is 7 to 10 inches, and average annual air temperature is 49 to 52 degrees F.

These soils are classified as sandy, mixed, mesic Typic Torrifluvents.

Typical pedon of Trail loamy sand, 1 to 5 percent slopes, about 1,100 feet east and 900 feet north of the southwest corner of sec. 3, T. 8 S., R. 104 W.

A—0 to 5 inches; light brownish gray (10YR 6/2) loamy sand, dark grayish brown (10YR 4/2) moist; single grain; loose, nonsticky and nonplastic; strongly effervescent; moderately alkaline; clear smooth boundary.

C—5 to 60 inches; light brownish gray (10YR 6/2) loamy sand with lenses of sandy loam, grayish brown (10YR 5/2) moist; massive; slightly hard, very friable, nonsticky and nonplastic; strongly effervescent; moderately alkaline.

The C horizon is stratified sand and loamy sand.

Travessilla Series

The Travessilla series consists of shallow and very shallow, well drained soils on dissected mesas. These soils formed in residuum derived from sandstone. Slope ranges from 10 to 35 percent. Average annual precipitation is 12 to 16 inches, and average annual air temperature is 46 to 52 degrees F.

These soils are classified as loamy, mixed (calcareous), mesic Lithic Ustic Torriorthents.

Typical pedon of Travessilla fine sandy loam, in an area of Travessilla-Rock outcrop complex, 10 to 35 percent slopes, about 500 feet north and 1,250 feet west of the southeast corner of sec. 11, T. 10 S., R. 98 W.

A—0 to 2 inches; brown (10YR 5/3) fine sandy loam, dark yellowish brown (10YR 3/4) moist; weak very fine crumb structure; soft, very friable, nonsticky and slightly plastic; slightly effervescent; slightly alkaline; clear smooth boundary.
C—2 to 9 inches; yellowish brown (10YR 5/4) fine sandy loam, dark yellowish brown (10YR 3/4) moist; massive; soft, very friable, nonsticky and slightly plastic; strongly effervescent; slightly alkaline; abrupt wavy boundary.
R—9 inches; sandstone.

Bedrock is at a depth of 4 to 20 inches. Hue is 7.5YR or 10YR throughout the profile. The texture is sandy loam, fine sandy loam, or loam.

Uffens Series

The Uffens series consists of deep, well drained soils on mesas and terraces. These soils formed in alluvium derived dominantly from mixed material. Slope ranges from 1 to 8 percent. Average annual precipitation is 7 to 10 inches, and average annual air temperature is 52 to 56 degrees F.

These soils are classified as fine-loamy, mixed, mesic Typic Natrargids.

Typical pedon of Uffens loam, 1 to 8 percent slopes, about 200 feet west and 600 feet north of the center of sec. 6, T. 8 S., R. 102 W.

E—0 to 5 inches; very pale brown (10YR 7/3) loam, brown (10YR 4/3) moist; strong thick platy structure; slightly hard, very friable, nonsticky and nonplastic; violently effervescent; moderately alkaline; abrupt smooth boundary.
Btn1—5 to 13 inches; pale brown (10YR 6/3) loam, brown (10YR 4/3) moist; moderate coarse columnar structure; extremely hard, friable, sticky and plastic; violently effervescent; strongly alkaline; clear smooth boundary.
Btn2—13 to 20 inches; pale brown (10YR 6/3) loam, brown (10YR 4/3) moist; weak coarse prismatic structure parting to weak coarse subangular blocky; extremely hard, friable, slightly sticky and slightly plastic; violently effervescent; very strongly alkaline; clear wavy boundary.
Btnz—20 to 27 inches; pale brown (10YR 6/3) loam, brown (10YR 4/3) moist; weak thick platy structure parting to weak medium subangular blocky; extremely hard, friable, sticky and plastic; few fine salt crystals; violently effervescent; very strongly alkaline; clear wavy boundary.
Cnz1—27 to 38 inches; pale brown (10YR 6/3) sandy loam, brown (10YR 5/3) moist; massive; very hard, friable, sticky and plastic; few fine salt crystals; violently effervescent; very strongly alkaline; clear wavy boundary.
Cnz2—38 to 60 inches; pale brown (10YR 6/3) sandy loam, brown (10YR 4/3) moist; massive; hard, very friable, nonsticky and nonplastic; common fine salt crystals; violently effervescent; strongly alkaline.

The E horizon has hue of 10YR or 2.5Y.

The B and C horizons have hue of 7.5YR to 2.5Y.

Utso Series

The Utso series consists of deep, well drained soils on side slopes. These soils formed in colluvium derived dominantly from the Green River shale formation. Slope ranges from 3 to 65 percent. Elevation is 6,800 to 8,600 feet. Average annual precipitation is 15 to 20 inches, and average annual air temperature is 40 to 46 degrees F.

These soils are classified as loamy-skeletal, mixed Pachic Haploborolls.

Typical pedon of Utso channery loam, in an area of Utso-Rock outcrop complex, 40 to 90 percent slopes, about 2,240 feet north and 1,750 feet west of the southeast corner of sec. 23, T. 6 S., R. 98 W.

A1—0 to 4 inches; dark brown (10YR 3/3) channery loam, very dark grayish brown (10YR 3/2) moist; weak fine crumb structure; soft, very friable, nonsticky and slightly plastic; 15 percent channers; slightly alkaline; clear wavy boundary.
A2—4 to 11 inches; dark grayish brown (10YR 4/2) very channery loam, very dark grayish brown (10YR 3/2) moist; weak very fine crumb structure; soft, very friable, nonsticky and slightly plastic; 40 percent channers; slightly alkaline; abrupt wavy boundary.
Bk—11 to 60 inches; grayish brown (10YR 5/2) extremely channery loam, very dark grayish brown (10YR 3/2) moist; massive; soft, very friable, nonsticky and slightly plastic; 70 percent channers; strongly effervescent; moderately alkaline.

The mollic epipedon is 29 to 60 inches thick, but colors in the lower part may be lithochromic. The content of rock fragments in the particle-size control section ranges from 45 to 70 percent. Calcareous material is at a depth of 11 to more than 60 inches. Hue is 7.5YR or 10YR throughout the profile.

Veatch Series

The Veatch series consists of moderately deep, well drained soils on benches and mountain side slopes. These soils formed in residuum derived dominantly from sandstone. Slope ranges from 12 to 65 percent. Average annual precipitation is 16 to 20 inches, and average annual air temperature is 40 to 45 degrees F.

These soils are classified as loamy-skeletal, mixed Typic Haploborolls.

Typical pedon of Veatch loam, in an area of Cathedral-Veatch complex, 25 to 85 percent slopes, about 700 feet west and 2,500 feet south of the northeast corner of sec. 30, T. 6 S., R. 102 W.

A—0 to 6 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; slightly hard, very friable, nonsticky and nonplastic; neutral; clear smooth boundary.

Bw—6 to 11 inches; dark grayish brown (10YR 4/2) loam, dark brown (10YR 3/3) moist; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; 5 percent channers; slightly alkaline; clear smooth boundary.

Bk1—11 to 22 inches; pale brown (10YR 6/3) very channery sandy loam, brown (10YR 5/3) moist; weak medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; 35 percent channers, 10 percent cobbles, 5 percent stones; lime occurs as spots; violently effervescent in spots, matrix is noncalcareous; moderately alkaline; clear wavy boundary.

Bk2—22 to 32 inches; pale brown (10YR 6/3) very channery sandy loam, brown (10YR 5/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; 35 percent channers, 10 percent cobbles, 5 percent stones; lime occurs as streaks and seams; violently effervescent; moderately alkaline; abrupt wavy boundary.

R—32 inches; hard sandstone.

Bedrock is at a depth of 20 to 40 inches. The content of rock fragments in the particle-size control section ranges from 35 to 64 percent. Hue is 7.5YR or 10YR throughout the profile.

Wesdy Series

The Wesdy series consists of deep, well drained soils on mountain side slopes. These soils formed in colluvium and glacial material derived dominantly from basalt. Slope ranges from 9 to 65 percent. Average annual precipitation is 25 to 30 inches, and average annual air temperature is 35 to 39 degrees F.

These soils are classified as clayey-skeletal, mixed Argic Cryoborolls.

Typical pedon of Wesdy stony loam, 9 to 25 percent slopes, very bouldery, about 150 feet north and 150 feet east of the southwest corner of sec. 20, T. 11 S., R. 96 W. About 1 to 3 percent of the surface is covered with boulders and stones that are spaced 20 to 100 feet apart.

A1—0 to 3 inches; very dark gray (10YR 3/1) stony loam, black (10YR 2/1) moist; moderate fine granular structure; soft, very friable, nonsticky and slightly plastic; 10 percent cobbles, 10 percent stones; neutral; clear wavy boundary.

A2—3 to 15 inches; very dark gray (10YR 3/1) stony loam, black (10YR 2/1) moist; weak fine subangular blocky structure parting to strong fine granular; slightly hard, friable, slightly sticky and slightly plastic; 10 percent cobbles, 10 percent stones; neutral; abrupt wavy boundary.

Bt1—15 to 39 inches; brown (7.5YR 4/4) very cobbly clay, dark brown (7.5YR 4/4) moist; weak medium subangular blocky structure parting to strong fine subangular blocky; very hard, very firm, sticky and plastic; 5 percent pebbles, 35 percent cobbles, 5 percent stones; slightly acid; gradual wavy boundary.

Bt2—39 to 60 inches; brown (7.5YR 4/4) very cobbly clay, dark brown (7.5YR 4/4) moist; weak coarse angular blocky structure; very hard, very firm, sticky and plastic; 5 percent pebbles, 30 percent cobbles, 10 percent stones; slightly acid.

The content of rock fragments in the particle-size control section ranges from 35 to 50 percent.

The A horizon has hue of 10YR or 7.5YR. Reaction is slightly acid or neutral.

The Bt horizon has hue of 7.5YR or 5YR. Reaction is slightly acid or neutral. The texture is very cobbly clay loam or very cobbly clay. The content of clay ranges from 35 to 50 percent.

Winnemucca Series

The Winnemucca series consists of deep, moderately well drained soils on moraines and till plains. These soils formed in mixed eolian material over residuum derived from basalt. Slope ranges from 1 to 10 percent. Elevation is 9,900 to 10,050 feet. Average annual precipitation is 25 to 30 inches, and average annual air temperature is 36 to 40 degrees F.

These soils are classified as clayey-skeletal, montmorillonitic Argic Pachic Cryoborolls.

Typical pedon of Winnemucca loam, in an area of Winnemucca-Castino loams, 1 to 10 percent slopes, stony, about 2,500 feet south and 500 feet east of the northwest corner of sec. 35, T. 11 S., R. 97 W. About 0.01 to 0.1 percent of the surface is covered with stones.

A1—0 to 5 inches; dark grayish brown (10YR 4/2) loam, very dark brown (10YR 2/2) moist; moderate medium granular structure; soft, very friable, nonsticky and slightly plastic; less than 5 percent gravel and cobbles; slightly acid; gradual wavy boundary.

A2—5 to 19 inches; dark grayish brown (10YR 4/2) loam, very dark brown (10YR 2/2) moist; weak medium subangular blocky structure parting to moderate medium granular; soft, very friable, nonsticky and slightly plastic; less than 5 percent gravel and cobbles; slightly acid; clear wavy boundary.

Bt1—19 to 28 inches; light yellowish brown (10YR 6/4) cobbly clay loam, dark yellowish brown (10YR 4/4) moist; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; few thin clay films in pores; 10 percent gravel, 15 percent cobbles; neutral; clear wavy boundary.

2Bt2—28 to 36 inches; brown (7.5YR 4/2) very cobbly heavy clay loam, brown (7.5YR 4/2) moist; moderate coarse prismatic structure parting to moderate medium angular blocky; hard, firm, sticky and plastic; many thin clay films on peds and in pores, few moderately thick clay films in pores; 10 percent gravel, 25 percent cobbles, 5 percent stones; neutral; clear wavy boundary.

2Bt3—36 to 42 inches; brown (7.5YR 4/2) very cobbly clay, dark brown (7.5YR 3/2) moist; moderate coarse prismatic structure parting to moderate medium angular blocky; hard, firm, sticky and plastic; common thin clay films on peds and in pores; 10 percent gravel, 25 percent cobbles, 5 percent stones; neutral; clear wavy boundary.

2BC—42 to 50 inches; brown (10YR 4/3) very cobbly clay, dark brown (10YR 4/3) moist; moderate coarse prismatic structure; hard, firm, sticky and plastic; few thin clay films on peds and in pores; 10 percent gravel, 25 percent cobbles, 5 percent stones; neutral; gradual wavy boundary.

2C—50 to 66 inches; brown (7.5YR 5/4) clay, dark brown (7.5YR 4/4) moist; massive; hard, firm, sticky and plastic; 10 percent cobbles; neutral.

The mollic epipedon is 16 to 22 inches thick. The thickness of the solum ranges from 35 to 42 inches.

The A horizon has hue of 7.5YR or 10YR.

The Bt horizons have hue of 7.5YR. They are very cobbly heavy clay loam or very cobbly light clay.

Wrayha Series

The Wrayha series consists of deep, well drained soils on side slopes of mountains and ridges. These soils formed in residuum derived from the variegated Wasatch Formation. Slope ranges from 12 to 65 percent. Average annual precipitation is 14 to 16 inches, and average annual air temperature is 40 to 45 degrees F.

These soils are classified as fine, montmorillonitic (calcareous), frigid Ustic Torriorthents.

Typical pedon of Wrayha gravelly sandy loam, in an area of Wrayha-Veatch-Rabbitex complex, 12 to 45 percent slopes, about 600 feet south and 1,800 feet west of the northeast corner of sec. 27, T. 8 S., R. 99 W.

A—0 to 4 inches; brown (10YR 5/3) gravelly sandy loam, dark brown (10YR 4/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; 20 percent gravel; strongly effervescent; moderately alkaline; clear wavy boundary.

C1—4 to 28 inches; pale olive (5Y 6/3) clay loam, light olive brown (2.5Y 5/4) moist; massive; very hard, firm, sticky and plastic; violently effervescent; moderately alkaline; clear smooth boundary.

C2—28 to 49 inches; reddish gray (10R 5/1) silty clay loam, reddish gray (5YR 5/2) moist; massive; very hard, firm, sticky and plastic; violently effervescent; moderately alkaline; clear smooth boundary.

C3—49 to 60 inches; grayish brown (2.5Y 5/2) silty clay loam, dark grayish brown (2.5Y 4/2) moist; massive; hard, friable, sticky and plastic; violently effervescent; moderately alkaline.

The content of clay ranges from 35 to 50 percent. Colors vary widely because of the variegated colors of the parent material.

Yamo Series

The Yamo series consists of deep, well drained soils on ridgetops. These soils formed in residuum derived from Hunter Canyon sandstone. Slope ranges from 3 to 25 percent. Average annual precipitation is 12 to 15 inches, and average annual air temperature is 40 to 45 degrees F.

These soils are classified as fine-loamy, mixed Borollic Camborthids.

Typical pedon of Yamo sandy clay loam, in an area of Yamo, moist-Redcreek complex, 3 to 25 percent slopes, about 2,000 feet north and 2,000 feet west of the southeast corner of sec. 12, T. 9 S., R. 100 W.

A—0 to 5 inches; brown (10YR 5/3) sandy clay loam, brown (10YR 4/3) moist; moderate medium granular structure; slightly hard, very friable, slightly sticky and slightly plastic; 5 percent gravel; neutral; clear smooth boundary.

Bw—5 to 16 inches; pale brown (10YR 6/3) sandy clay loam, brown (10YR 5/3) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; 5 percent gravel; strongly effervescent; slightly alkaline; clear smooth boundary.

Bk1—16 to 40 inches; pale brown (10YR 6/3) sandy clay loam, brown (10YR 5/3) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; 5 percent soft lime masses; 5 percent gravel; strongly effervescent; slightly alkaline; clear smooth boundary.

Bk2—40 to 60 inches; pale brown (10YR 6/3) sandy loam, brown (10YR 5/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; 5 percent gravel; disseminated lime; strongly effervescent; slightly alkaline.

Hue is 7.5YR or 10YR. The content of clay ranges from 20 to 30 percent in the particle-size control section.

Youngston Series

The Youngston series consists of deep, well drained soils on alluvial fans, valley bottoms, low terraces, and flood plains. These soils formed in calcareous, stratified alluvium. Slope ranges from 1 to 6 percent. Average annual precipitation is 6 to 10 inches, and average annual air temperature is 46 to 52 degrees F.

These soils are classified as fine-loamy, mixed (calcareous), mesic Typic Torrifluvents.

Typical pedon of Youngston loam, 1 to 6 percent slopes, about 1,200 feet west and 2,000 feet north of the southeast corner of sec. 6, T. 8 S., R. 102 W.

A—0 to 4 inches; light brownish gray (2.5Y 6/2) loam, dark grayish brown (2.5Y 4/2) moist; weak very fine subangular blocky structure; hard, friable, slightly sticky and slightly plastic; 0 to 5 percent gravel fragments; violently effervescent; moderately alkaline; clear smooth boundary.

C1—4 to 14 inches; pale brown (10YR 6/3) loam, brown (10YR 5/3) moist; moderate thin platy structure; hard, friable, slightly sticky and slightly plastic; violently effervescent; moderately alkaline; clear smooth boundary.

C2—14 to 30 inches; pale brown (10YR 6/3), stratified loam, brown (10YR 5/3) moist; massive; hard, friable, slightly sticky and slightly plastic; violently effervescent; moderately alkaline; gradual wavy boundary.

Cz—30 to 60 inches; pale brown (10YR 6/3), stratified loam, brown (10YR 5/3) moist; massive; hard, very friable, nonsticky and nonplastic; common fine salt crystals; violently effervescent; moderately alkaline.

The depth to uniformly calcareous material ranges from 0 to 10 inches. Calcium carbonate equivalent ranges from 4 to 14 percent.

The A and C horizons have hue of 5Y to 7.5YR.

Formation of the Soils

By Leslie W. Williams, soil scientist, Natural Resources Conservation Service

There are five principal factors of soil formation—climate, living organisms, parent material, topography, and time. The soil-forming factors are interdependent, and each modifies the effects of the others.

Soil is a naturally occurring body at the surface of the earth that forms as a result of the combined effects of the five soil-forming factors. Its characteristics result from action of the environment on geologic parent material over time. The kind of soil differs from place to place, depending on the maturity and intensity of the factors that controlled its development.

The formation of soils involves a process consisting of two steps: (1) accumulation of parent material; and (2) differentiation of horizons in the profile (Buol and others, 1973).

Parent material accumulates by water, wind, ice, or ground creep deposition. It also accumulates by slow weathering of bedrock.

Horizon differentiation results from four basic kinds of change: (1) gain of material; (2) removal or leaching of material; (3) shifting of position of material; and (4) chemical changes. These four changes interact in the formation of most soils, but one or more may be much more evident in some soils than in others. For example, the amount of rainfall has resulted in accumulation of organic matter in Adel soils, while the length of time during which soil formation has taken place has allowed for the shifting of clay from the surface layer to the subsoil in Fughes soils.

Many properties of soils are products of addition, removal, translocation, or transformation of organic matter, bases, soluble salts, carbonates, sesquioxides, or silicate clay minerals. Organic matter is added to the surface and transformed into humus by decay. Where drainage is good, salts and gypsum are moved downward and, except in the drier areas, are removed from the soils. Lime is also removed from some soils, and in others it accumulates at the depth of normal moisture penetration. In some coarse textured or very channery soils, clay has moved completely through the soil. In other soils, clay has accumulated in the subsoil. In soils where both clay and lime have moved, the carbonates have leached to a greater depth than the clay. For example, most of the clay accumulation in Pagoda soils is between depths of 10 and 27 inches, whereas most of the lime accumulation is at a depth of 27 to 60 inches.

In much of the mountainous part of the survey area, changes in one or more of the soil-forming factors occur within relatively short distances. Different soils form because of microclimates, which are the results of differences in elevation, air drainage, and topography, including slope gradient and aspect. Changes in other factors, such as parent material, vegetation, and time, further increase the number of different kinds of soil in the area.

The five factors of soil formation are described in the following paragraphs.

Climate

Climate is an active factor of soil formation. In the Douglas-Plateau area, the main climatic components affecting soil formation are precipitation and temperature. Geologic erosion and alternate freezing and heating break rocks down into small fragments. The weathered material is further broken down by chemical reactions, such as solution and hydration.

The driest parts of the survey area are near DeBeque and Cameo and in the southwest corner of Garfield County. In these areas, where the elevation is between 4,500 and about 5,600 feet, soils generally receive between 7 and 10 inches of precipitation and the mean annual temperature is about 50 degrees F. Because of warm temperatures and the small amount of moisture, the soils in these areas have a low content of organic matter, are light in color, and contain calcium carbonate at or near the surface. Some soils have gypsum or salts at a shallow depth. The soils in these areas are Entisols or Aridisols. Examples are Persayo, Youngston, Mesa, and Uffens soils.

The communities of Mesa and Collbran are representative of a part of the survey area that has intermediate temperature and moisture. Except in areas that are distinctly south-facing or that allow rapid

runoff, the soils are generally Mollisols. For example, Peninsula soils, at elevations between 6,200 and 6,800 feet and having an average temperature of about 44 degrees F, receive about 16 inches of precipitation. These soils have a moderately dark surface layer about 10 inches thick, and calcium carbonates have been leached to a depth of about 19 inches.

Most areas above an elevation of about 8,000 feet have average yearly temperatures of less than 40 degrees F and receive between 18 and 25 inches of precipitation. The soils in these areas are mostly Mollisols and commonly have a high content of organic matter and a thick, dark surface layer and are leached of salts and generally also leached of carbonates. Adel, Cochetopa, and Rhone soils are examples.

On Grand Mesa, at an elevation of about 10,000 feet, where the precipitation is about 28 inches and the runoff rate is slow, Callings soils have an acidic surface layer and a subsurface horizon that appears to have had some leaching of both clay and iron oxides.

In places, the crest of the Roan Plateau has been windswept. The snow is blown off localized areas of convex micro-relief and is pocketed in concave places. The sites from which the snow is blown off have a distinctly lighter colored surface layer and are not leached of carbonates. Starman soils on these sites contrast sharply from the nearby soils in more favorable positions.

Living Organisms

Living organisms also are active in the formation of soils. Organic matter is the main source of the dark color in soils. Fungi and algae are among the earliest inhabitants of rock material, and they help break down the rock. As the rock weathers, grasses, shrubs, and trees are able to grow and support animal life.

The kinds of plants and animals in an area largely determine the kinds and amount of organic matter added to the soil and how this matter is incorporated with the mineral part of the soil. Roots, insects, and rodents penetrate the soil and influence its structure and porosity. Leaves and roots that stay in the surface layer are changed to humus by micro-organisms and insects.

The plants in the survey area include desert shrubs and grasses at the lower elevations; pinyon, juniper, and the larger shrubs in the foothills and on the lower mountains; and aspen, cinquefoil, spruce, and fir at the highest elevations. Some desert shrubs, such as shadscale, recycle salts from the lower depths back to the surface. Root systems of most perennial grasses are renewed every 3 years. Silas soils, which support a relatively large amount of grass, are examples of soils that have a considerable content of organic matter and that formed under grasses and shrubs. On Grand Mesa, litter of spruce and fir needles contributes to acidifying the surface layer of the Callings soils.

Common rodents are gophers, prairie dogs, badgers, rabbits, and marmots. Pebbles and cobbles on the surface of terraces and in many other areas have been dug up by burrowing rodents.

Topography

Slope gradient, configuration, and aspect affect soil development. Position on the landscape also is important. These features influence the amount of water that reaches the soil, the amount of water that is retained by the soil, and the amount of water that runs off the soil. They also influence the amount of colluvial deposition onto some soils. Geologic or accelerated erosion, soil temperature, and wind movement also are affected by relief.

Much of the survey area is steep or extremely steep. Many of the soils formed in colluvium derived from the higher and commonly steeper areas. For example, Happle soils consist largely of channery colluvium derived from outcrops of highly fractured rock.

In general, the steeper the soil, the more rapid the rate of water runoff. In some steep or extremely steep areas, the rapid runoff rate severely limits soil formation. The runoff wears away some of the earth or geologic material. Also, water that runs off does not contribute to the development of the soil profile. Extremely steep soils in the survey area commonly are shallow; have a thin, light colored surface layer; and are not characterized by significant movement of lime or clay within the profile.

Configuration influences soil characteristics. Soils in concave areas, where sediments and moisture accumulate, have thicker and more leached profiles than soils on convex slopes, where water runs off and erosion is active.

Aspect is significant, especially at the higher elevations. The shade-oriented Adel soils are cool and support luxuriant vegetation, including trees. They have a thick, dark surface layer that is high in content of organic matter, and they absorb moisture readily. They lose relatively little moisture through runoff. Nearby sun-facing exposures commonly have soils

that are less deep or that have a surface layer that is thinner or lighter colored.

Low-lying soils are influenced by runoff from surrounding steeper soils and material deposited by nearby streams and rivers. Soils in areas where deposition proceeds at a rate faster than organic matter forms commonly have a light colored surface layer, even though the soil profile has enough moisture for the development of a darker surface layer. Occasional flooding commonly leads to stratified soils. Cameo and Aga soils are examples of stratified soils. Some low-lying soils have layers that are saturated with water, either all year or for a significant part of the year. In areas where they are wet only part of the time and where the water is moving, those layers may develop rust-colored mottles. Fluvaquents are commonly characterized by these oxidized iron colors in the lower part of the profile. Soils in localized areas of persistent or stagnant water have underlying layers with drab colors of low chroma, indicating iron in the reduced form.

Parent Material

The soils of the survey area formed in several types of parent material. The more extensive materials are marine shales of the Wasatch Formation, intermixed shale and sandstone of the Mesa Verde group, and siltstones and hard shales of the Uinta and Green River Formations. Of moderate extent are areas of massive sandstone. Of limited extent are areas of Mancos shale, wind-laid deposits, and glacial till. There are also flood-plain or stream-deposited sediments, ranging from those laid down by rapidly moving streams carrying sediments of mixed origin to those laid down by slower streams carrying loads from dominantly shale sources.

The northeastern part of the survey area is dominated by carbonaceous siltstone, shale, and fine grained sandstone and a lesser amount of marlstone. The soils that formed in these rocks commonly are loamy and contain varying amounts of channers. Northwater and Rhone soils are deep and contain many channery fragments in the subsoil. Both soils are on moderately steep mountain side slopes. Irigul and Starman soils are very channery throughout, are shallow to bedrock, and are on the ridgecrests. Silas soils are on valley floors in narrow mountain valleys and are deep, dark, and loamy.

Much of the survey area is dominated by landscapes that have been shaped in the Wasatch Formation. This formation consists mostly of brightly colored clay and shale. The soils that formed in this material generally are fine textured and have clay mineralogy dominated by montmorillonite. They typically have a surface layer of clay loam or silty clay loam. Dominguez and Cerro soils are examples. Within a radius of 10 miles of DeBeque, the Wasatch Formation has a significant sandstone lens, which has imparted a gravelly loam or gravelly sandy loam surface layer to the soils. Biedsaw and Wrayha soils are examples of such soils that formed in this area. Soils derived from the Wasatch shales are generally deep, are highly or very highly plastic, and are notably subject to slumping. Pagoda soils exhibit all of these features.

A moderately extensive area south and west of DeBeque consists of mesas and structural benches on sandstone. Travessilla soils are fine sandy loams and are underlain at a shallow depth by the hard, massive sandstone in this area.

Some low hills in the southwestern part of the survey area are remnants of Mancos shale. These drab-colored marine deposits are relatively high in gypsum and lime and contain some more soluble salts, chiefly sodium sulfate. Chipeta soils are examples of soils that formed in this material.

Glacial till is on Grand Mesa and flanks its sides. The till, which is of basaltic origin, has developed into soils that reflect the basalt. Features characteristic of basalt-derived soils include brownish hues, a relatively high base saturation, many cobbles and stones, and a typical surface texture of loam in the fine-earth fraction. Wesdy soils are examples.

Some low structural benches near the Colorado River and Plateau Creek have remnants of post-glacial eolian deposits. These deposits have developed into medium textured, pebble-free soils. Barx soils are examples. Some of the basaltic till on Grand Mesa is capped by loess. The soils that formed in this material are loamy and are essentially free of rock fragments in the wind-deposited surface layer.

The Colorado River carries sediments from mixed rock sources. Cameo soils, which formed in deposits from fast-moving overflow, are stratified sandy loam and loamy sand. In contrast, Billings soils, which formed in alluvium of dominantly shale origin, are mostly silty clay loam.

Time

Soil formation or development relates mainly to the length of time during which the other four soil-forming factors have interacted. The other soil-forming factors determine the direction of soil-forming processes. The extent of their effects on the soil depends in part on the amount of time in which those processes have been operating. For example, the relatively old and

stable Fughes soils have a thicker and darker surface layer than the Cameo soils, which are forming in more recent deposits.

As soils increase in age, significant changes occur that affect plant nutrition and permeability to roots, air, and water. Bases, such as calcium, magnesium, sodium, and potassium, move downward in the soil profile.

In consort with heat and moisture, time allows for chemical breakdown of feldspar and other weatherable minerals. Over extensive cycles of years, those less stable minerals reform into silicate clay. Together with the migration of clay from the surface layer over time, this formation of silicate clay results in a subsoil that has distinctly more clay than the surface layer. Mesa, Peninsula, and Wesdy soils are examples of soils with distinctly more clay in the subsoil than in the surface layer.

Time also allows the development of soil structure. Soils on stable land surfaces tend to have moderate or strong prismatic or angular blocky structure. Soils of recent or young age tend to have weak or moderate granular, platy, or subangular blocky structure. Structure in the older soils generally extends to a moderate or deep depth, and structure in younger soils generally is confined to a shallow or moderate depth. For example, Peninsula soils, which are older soils on terraces, have moderate or strong prismatic or angular blocky structure. Panitchen soils, which are on the younger valley floors, have weak granular or subangular blocky structure.

Over extended time, iron transformation commonly creates more reddish hues in the subsoil. Most of the older soils in the survey area have a subsoil with hue of 7.5YR or 5YR. Peninsula soils, for example, have a surface layer with hue of 10YR and a subsoil with hue of 5YR. Most of the younger soils have hue of 10YR or 2.5YR. Panitchen soils are some of the younger soils in the survey area. They have hue of 10YR throughout.

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Glossary

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvial fan. The fanlike deposit of a stream where it issues from a gorge upon a plain or of a tributary stream near or at its junction with its main stream.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Animal unit month (AUM). The amount of forage required by one mature cow of approximately 1,000 pounds weight, with or without a calf, for 1 month.

Aquic conditions. Current soil wetness characterized by saturation, reduction, and redoximorphic features.

Argillic horizon. A subsoil horizon characterized by an accumulation of illuvial clay.

Aspect. The direction in which a slope faces.

Association, soil. A group of soils or miscellaneous areas geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as:

Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Backslope. The position that forms the steepest and generally linear, middle portion of a hillslope. In profile, backslopes are commonly bounded by a convex shoulder above and a concave footslope below.

Badland. Steep or very steep, commonly nonstony, barren land dissected by many intermittent drainage channels. Badland is most common in semiarid and arid regions where streams are entrenched in soft geologic material. Local relief generally ranges from 25 to 500 feet. Runoff potential is very high, and geologic erosion is active.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bottom land. The normal flood plain of a stream, subject to flooding.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Breaks. The steep and very steep broken land at the border of an upland summit that is dissected by ravines.

Brush management. Use of mechanical, chemical, or biological methods to make conditions favorable for reseeding or to reduce or eliminate competition from woody vegetation and thus allow understory grasses and forbs to recover. Brush management increases forage production and thus reduces the hazard of erosion. It can improve the habitat for some species of wildlife.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

Canyon. A long, deep, narrow, very steep sided valley with high, precipitous walls in an area of high local relief.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

Channery soil material. Soil material that has, by volume, 15 to 35 percent thin, flat fragments of

sandstone, shale, slate, limestone, or schist as much as 6 inches (15 centimeters) along the longest axis. A single piece is called a channer.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Climax plant community. The stabilized plant community on a particular site. The plant cover reproduces itself and does not change so long as the environment remains the same.

Coarse textured soil. Sand or loamy sand.

Cobble (or cobblestone). A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.

COLE (coefficient of linear extensibility). See Linear extensibility.

Colluvium. Soil material or rock fragments, or both, moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex slope. Irregular or variable slope. Planning or establishing terraces, diversions, and other water-control structures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil or miscellaneous areas in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas.

Concretions. Cemented bodies with crude internal symmetry organized around a point, a line, or a plane. They typically take the form of concentric layers visible to the naked eye. Calcium carbonate, iron oxide, and manganese oxide are common compounds making up concretions. If formed in place, concretions of iron oxide or manganese oxide are generally considered a type of redoximorphic concentration.

Consistence, soil. Refers to the degree of cohesion and adhesion of soil material and its resistance to deformation when ruptured. Consistence includes resistance of soil material to rupture and to penetration; plasticity, toughness, and stickiness of puddled soil material; and the manner in which the soil material behaves when subject to compression. Terms describing consistence are defined in the "Soil Survey Manual."

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Corrosion. Soil-induced electrochemical or chemical action that dissolves or weakens concrete or uncoated steel.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Crop residue management. Returning crop residue to the soil, which helps to maintain soil structure, organic matter content, and fertility and helps to control erosion.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Decreasers. The most heavily grazed climax range plants. Because they are the most palatable, they are the first to be destroyed by overgrazing.

Deferred grazing. Postponing grazing or resting grazing land for a prescribed period.

Depth, soil. Generally, the thickness of the soil over bedrock. Deep soils are more than 40 inches deep over bedrock; moderately deep soils, 20 to 40 inches; shallow, 10 to 20 inches; and very shallow, less than 10 inches.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of wet periods under conditions similar to those under which the soil formed. Alterations of the water regime by human activities, either through drainage or irrigation, are not a consideration unless they have significantly changed the morphology of the soil. Seven classes of natural soil drainage are recognized—*excessively drained, somewhat excessively drained, well drained, moderately well drained, somewhat poorly drained, poorly drained,* and *very poorly drained.* These classes are defined in the "Soil Survey Manual."

Ecological site. An area where climate, soil, and relief are sufficiently uniform to produce a distinct natural plant community. An ecological site is the product of all the environmental factors responsible for its development. It is typified by an association of species that differ from those on other ecological sites in kind and/or proportion of species or in total production.

Eolian soil material. Earthy parent material

accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, such as a fire, that exposes the surface.

Erosion pavement. A layer of gravel or stones that remains on the surface after fine particles are removed by sheet or rill erosion.

Escarpment. A relatively continuous and steep slope or cliff breaking the general continuity of more gently sloping land surfaces and resulting from erosion or faulting. Synonym: scarp.

Excess salt (in tables). Excess water-soluble salts in the soil that restrict the growth of most plants.

Fast intake (in tables). The rapid movement of water into the soil.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fine textured soil. Sandy clay, silty clay, or clay.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flagstone. A thin fragment of sandstone, limestone, slate, shale, or (rarely) schist 6 to 15 inches (15 to 38 centimeters) long.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Foothill. A steeply sloping upland that has relief of as much as 1,000 feet (300 meters) and fringes a mountain range or high-plateau escarpment.

Footslope. The position that forms the inner, gently inclined surface at the base of a hillslope. In profile, footslopes are commonly concave. A footslope is a transition zone between upslope sites of erosion and transport (shoulders and backslopes) and downslope sites of deposition (toeslopes).

Forb. Any herbaceous plant not a grass or a sedge.

Frost action (in tables). Freezing and thawing of soil moisture. Frost action can damage roads, buildings and other structures, and plant roots.

Glacial till. Unsorted, nonstratified glacial drift consisting of clay, silt, sand, and boulders transported and deposited by glacial ice.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock as much as 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that has 15 to 35 percent, by volume, rounded or angular rock fragments, not prominently flattened, as much as 3 inches (7.6 centimeters) in diameter.

Ground water. Water filling all the unblocked pores of the material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Hard bedrock. Bedrock that cannot be excavated except by blasting or by the use of special equipment that is not commonly used in construction.

Head slope. A geomorphic component of hills consisting of a laterally concave area of a hillside, especially at the head of a drainageway. The overland waterflow is converging.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the "Soil Survey Manual." The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material.

Also, a plowed surface horizon, most of which was originally part of a B horizon.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying soil material. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

Cr horizon.—Soft, consolidated bedrock beneath the soil.

R layer.—Consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon, but it can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff potential. The soil properties that influence this potential are those that affect the minimum rate of water infiltration on a bare soil during periods after prolonged wetting when the soil is not frozen. These properties are depth to a seasonal high water table, the infiltration rate and permeability after prolonged wetting, and depth to a very slowly permeable layer. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff.

Increasers. Species in the climax vegetation that increase in amount as the more desirable plants are reduced by close grazing. Increasers commonly are the shorter plants and the less palatable to livestock.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake, in inches per hour, is expressed as follows:

Less than 0.2	very low
0.2 to 0.4	low
0.4 to 0.75	moderately low
0.75 to 1.25	moderate
1.25 to 1.75	moderately high
1.75 to 2.5	high
More than 2.5	very high

Interfluve. An elevated area between two drainageways that sheds water to those drainageways.

Invaders. On range, plants that encroach into an area and grow after the climax vegetation has been reduced by grazing. Generally, plants invade following disturbance of the surface.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are:

Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.

Border.—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.

Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Wild flooding.—Water, released at high points, is allowed to flow onto an area without controlled distribution.

K_{sat}. Saturated hydraulic conductivity. (See Permeability.)

Landslide. The rapid downhill movement of a mass of soil and loose rock, generally when wet or saturated. The speed and distance of movement, as well as the amount of soil and rock material, vary greatly.

Large stones (in tables). Rock fragments 3 inches (7.6 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Leaching. The removal of soluble material from soil or other material by percolating water.

Light textured soil. Sand and loamy sand.

Linear extensibility. Refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. Linear extensibility is used to determine the shrink-swell potential of soils. It is an expression of the volume change between the water content of the clod at $^1/_3$- or $^1/_{10}$-bar tension (33kPa or 10kPa tension) and oven dryness. Volume change is influenced by the amount and type of clay minerals in the soil. The volume change is the percent change for the whole soil. If it is expressed as a fraction, the resulting value is COLE, coefficient of linear extensibility.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by wind.

Low strength. The soil is not strong enough to support loads.

Marl. An earthy, unconsolidated deposit consisting chiefly of calcium carbonate mixed with clay in approximately equal amounts.

Mechanical treatment. Use of mechanical equipment for seeding, brush management, and other management practices.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Mesa. A broad, nearly flat topped and commonly isolated upland mass characterized by summit widths that are more than the heights of bounding erosional scarps.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Coarse sandy loam, sandy loam, or fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, or silty clay loam.

Mollic epipedon. A thick, dark, humus-rich surface horizon (or horizons) that has high base saturation and pedogenic soil structure. It may include the upper part of the subsoil.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Descriptive terms are as follows: abundance—*few, common,* and *many;* size—*fine, medium,* and *coarse;* and contrast—*faint, distinct,* and *prominent.* The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium,* from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse,* more than 15 millimeters (about 0.6 inch).

Mudstone. Sedimentary rock formed by induration of silt and clay in approximately equal amounts.

Munsell notation. A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

Natric horizon. A special kind of argillic horizon that contains enough exchangeable sodium to have an adverse effect on the physical condition of the subsoil.

Neutral soil. A soil having a pH value of 6.6 to 7.3. (See Reaction, soil.)

Nose slope. A geomorphic component of hills consisting of the projecting end (laterally convex area) of a hillside. The overland waterflow is predominantly divergent.

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Outwash plain. A landform of mainly sandy or coarse textured material of glaciofluvial origin. An outwash plain is commonly smooth; where pitted, it generally is low in relief.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affects the specified use.

Permeability. The quality of the soil that enables water or air to move downward through the profile. The rate at which a saturated soil transmits water is accepted as a measure of this quality. In soil physics, the rate is referred to as "saturated hydraulic conductivity," which is defined in the "Soil Survey Manual." In line with conventional usage in the engineering profession and with traditional usage in published soil surveys, this rate of flow continues to be expressed as "permeability." Terms describing permeability, measured in inches per hour, are as follows:

Extremely slow	0.0 to 0.01 inch
Very slow	0.01 to 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management, such as slope, stoniness, and flooding.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Potential native plant community. See Climax plant community.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Proper grazing use. Grazing at an intensity that maintains enough cover to protect the soil and maintain or improve the quantity and quality of the desirable vegetation. This practice increases the vigor and reproduction capacity of the key plants and promotes the accumulation of litter and mulch necessary to conserve soil and water.

Rangeland. Land on which the potential natural vegetation is predominantly grasses, grasslike plants, forbs, or shrubs suitable for grazing or browsing. It includes natural grasslands, savannas, many wetlands, some deserts, tundras, and areas that support certain forb and shrub communities.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Ultra acid	less than 3.5
Extremely acid	3.5 to 4.4
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Moderately acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Slightly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Redoximorphic features. Redoximorphic concentrations, redoximorphic depletions, reduced matrices, a positive reaction to alpha,alpha-dipyridyl, and other features indicating the chemical reduction and oxidation of iron and manganese compounds resulting from saturation.

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rock fragments. Rock or mineral fragments having a

diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Saline soil. A soil containing soluble salts in an amount that impairs growth of plants. A saline soil does not contain excess exchangeable sodium.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-sized particles.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Shoulder. The position that forms the uppermost inclined surface near the top of a hillslope. It is a transition from backslope to summit. The surface is dominantly convex in profile and erosional in origin.

Shrink-swell (in tables). The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Side slope. A geomorphic component of hills consisting of a laterally planar area of a hillside. The overland waterflow is predominantly parallel.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

Slickspot. A small area of soil having a puddled, crusted, or smooth surface and an excess of exchangeable sodium. The soil generally is silty or clayey, is slippery when wet, and is low in productivity.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance. In this survey, classes for simple slopes are as follows:

Nearly level	0 to 2 percent
Gently sloping	2 to 5 percent
Moderately sloping	5 to 9 percent
Strongly sloping	9 to 15 percent
Moderately steep	15 to 30 percent
Steep	30 to 50 percent
Very steep	50 percent and higher

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Slow refill (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

Sodium adsorption ratio (SAR). A measure of the amount of sodium (Na) relative to calcium (Ca) and magnesium (Mg) in the water extract from saturated soil paste. It is the ratio of the Na concentration divided by the square root of one-half of the Ca + Mg concentration.

Soft bedrock. Bedrock that can be excavated with trenching machines, backhoes, small rippers, and other equipment commonly used in construction.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent

material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the material below the solum. The living roots and plant and animal activities are largely confined to the solum.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 15 to 24 inches (38 to 60 centimeters) in length if flat.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grain* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Substratum. The part of the soil below the solum.

Subsurface layer. Any surface soil horizon (A, E, AB, or EB) below the surface layer.

Summit. The topographically highest position of a hillslope. It has a nearly level (planar or only slightly convex) surface.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Surface soil. The A, E, AB, and EB horizons, considered collectively. It includes all subdivisions of these horizons.

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior. Soils are recognized as taxadjuncts only when one or more of their characteristics are slightly outside the range defined for the family of the series for which the soils are named.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). Otherwise suitable soil material that is too thin for the specified use.

Toeslope. The position that forms the gently inclined surface at the base of a hillslope. Toeslopes in profile are commonly gentle and linear and are constructional surfaces forming the lower part of a hillslope continuum that grades to valley or closed-depression floors.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Underlying material. The part of the soil below the surface layer; in particular, material below an A or AC horizon in soils that do not have a B horizon.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

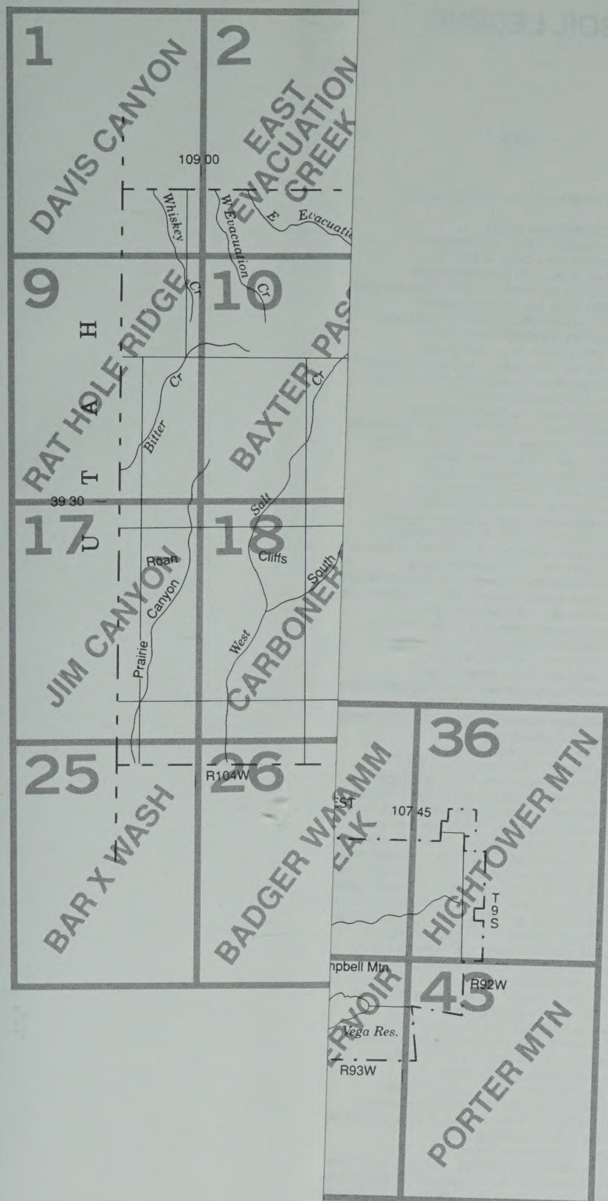
Variegation. Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil

normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.



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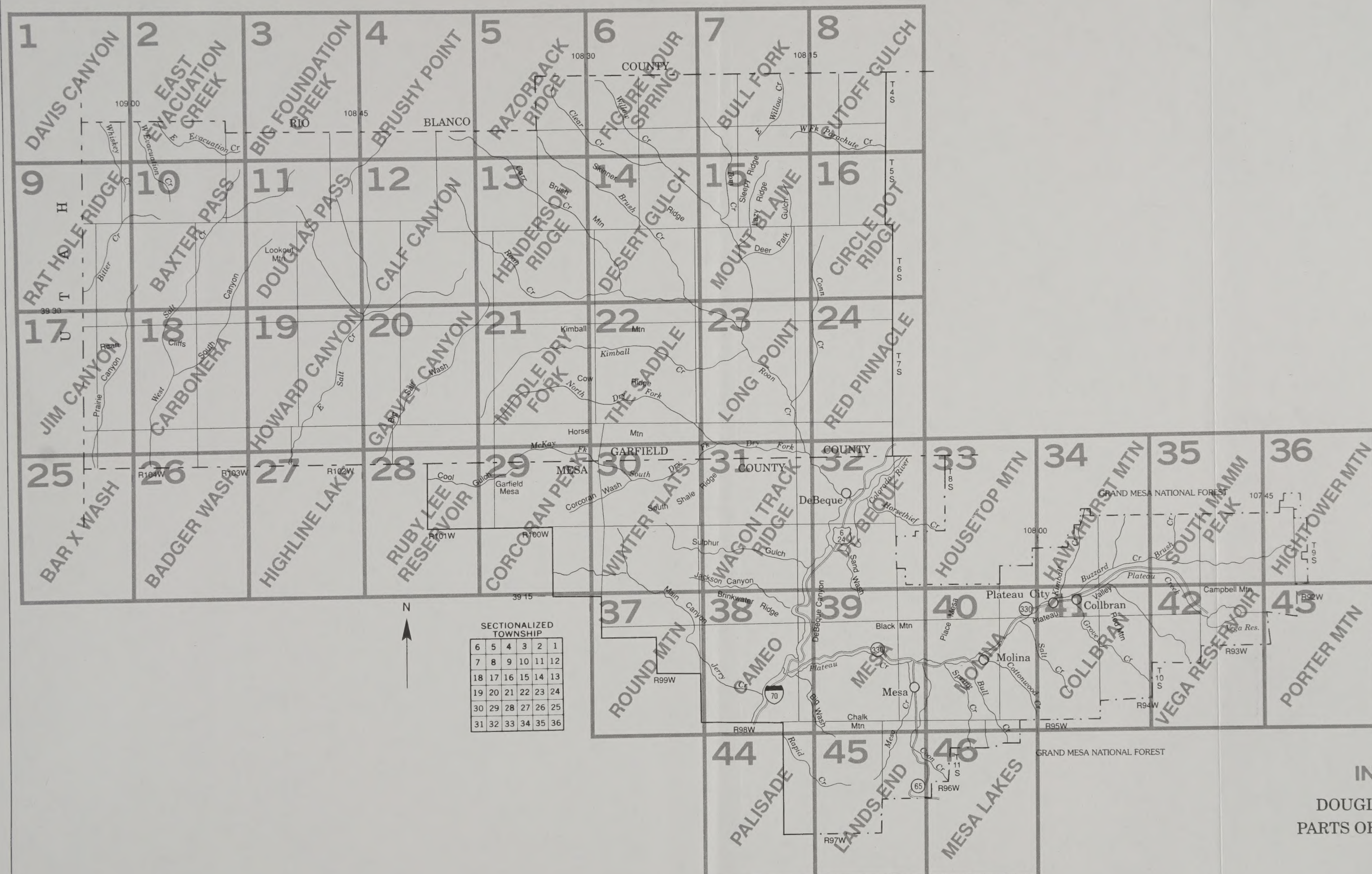
DOUGLAS-PLATEAU AREA, COLORADO
PARTS OF GARFIELD AND MESA COUNTIES

Scale 1:443,520

1 0 1 2 3 4 5 6 7 Miles

0 7 14 Km



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DOUGLAS-PLATEAU AREA, COLORADO
PARTS OF GARFIELD AND MESA COUNTIES

Scale 1:443,520

1 0 1 2 3 4 5 6 7 Miles

0 7 14 Km

SOIL LEGEND

SYMBOL	NAME
1	Aga very fine sandy loam, 0 to 3 percent slopes
2	Badland
3	Barx loam, 3 to 12 percent slopes
4	Barx-Clapper complex, 3 to 12 percent slopes
5	Battlement loam, 1 to 8 percent slopes
6	Battlement loam, saline, 1 to 8 percent slopes
7	Biedsaw-Sunup gravelly loams, 10 to 40 percent slopes
8	Billings silty clay loam, 1 to 6 percent slopes
9	Bookcliff-Utso, cool, complex, 3 to 25 percent slopes
10	Borollic Calciorthids, 25 to 50 percent slopes
11	Borpark stony loam, 40 to 75 percent slopes
12	Bunkwater very fine sandy loam, 1 to 8 percent slopes
13	Caballo very channery loam, 40 to 80 percent slopes
14	Callings loam, 1 to 10 percent slopes
15	Cameo fine sandy loam, 1 to 6 percent slopes
16	Castino-Skisams-Winnemucca loams, 1 to 10 percent slopes, stony
17	Cathedral-Veatch complex, 25 to 85 percent slopes
18	Cerro silty clay loam, 2 to 6 percent slopes
19	Cerro silty clay loam, 6 to 12 percent slopes
20	Cerro silty clay loam, 12 to 25 percent slopes
21	Chipeta silty clay loam, 3 to 30 percent slopes
22	Clapper very stony loam, 12 to 25 percent slopes
23	Clapper very stony loam, 25 to 65 percent slopes
24	Cochetopa-Clayburn complex, 12 to 40 percent slopes
25	Cowestglen sandy loam, 1 to 8 percent slopes
26	Cryochrepts-Cryoborolls-Rubble land complex, 15 to 90 percent slopes
27	Cryorthents-Rock outcrop complex, 50 to 90 percent slopes
28	Cumulic Haploborolls, 1 to 3 percent slopes
29	Debeque very channery loam, 5 to 20 percent slopes
30	Debeque-Hesperus complex, 5 to 25 percent slopes
31	Dominguez clay loam, 1 to 3 percent slopes
32	Dominguez clay loam, 3 to 8 percent slopes
33	Emmons-Cerro-Pagoda complex, 5 to 30 percent slopes, very stony
34	Empedrado loam, 25 to 45 percent slopes
35	Empedrado-Pagoda-Godding complex, 6 to 25 percent slopes, stony
36	Fluvaquents, 0 to 3 percent slopes
37	Fughes clay loam, 2 to 6 percent slopes
38	Fughes clay loam, 3 to 9 percent slopes, stony
39	Fughes-Hesperus complex, 3 to 12 percent slopes
40	Godding stony loam, 9 to 25 percent slopes, extremely bouldery
41	Golime cobbly loam, 5 to 15 percent slopes, very bouldery
42	Grobutte very channery loam, 30 to 60 percent slopes
43	Haploborolls-Rock outcrop complex, 50 to 80 percent slopes
44	Happle very channery sandy loam, 3 to 12 percent slopes
45	Happle very channery sandy loam, 12 to 25 percent slopes
46	Happle-Rock outcrop association, 25 to 65 percent slopes
47	Hesperus-Empedrado, moist-Pagoda complex, 5 to 35 percent slopes
48	Hesperus-Empedrado, moist-Pagoda complex, 35 to 55 percent slopes
49	Hesperus-Pagoda complex, 3 to 12 percent slopes
50	Irigul-Starman channery loams, 5 to 35 percent slopes
51	Mesa-Avalon complex, 3 to 12 percent slopes
52	Northwater-Adel complex, 5 to 50 percent slopes
53	Pagoda-Hesperus complex, 12 to 40 percent slopes
54	Panitchen loam, 1 to 6 percent slopes
55	Parachute-Irigul complex, 5 to 30 percent slopes
56	Parachute-Irigul-Rhone association, 25 to 50 percent slopes
57	Parachute-Rhone loams, 5 to 30 percent slopes
58	Peninsula loam, 3 to 9 percent slopes
59	Persayo silty clay loam, 3 to 25 percent slopes
60	Redcreek-Rentsac complex, 5 to 40 percent slopes
61	Rock outcrop-Torriorthents complex, 15 to 90 percent slopes
62	Shawa loam, 3 to 20 percent slopes
63	Silas loam, 1 to 12 percent slopes
64	Torrifluvents-Gullied land complex, 0 to 2 percent slopes
65	Torriorthents, cool-Rock outcrop complex, 35 to 90 percent slopes
66	Torriorthents, warm-Rock outcrop complex, 35 to 90 percent slopes
67	Tosca channery loam, 25 to 80 percent slopes
68	Trail loamy sand, 1 to 5 percent slopes
69	Travessilla-Rock outcrop complex, 10 to 35 percent slopes
70	Uffens loam, 1 to 8 percent slopes
71	Utso-Rock outcrop complex, 40 to 90 percent slopes
72	Wesdy stony loam, 9 to 25 percent slopes, very bouldery
73	Wesdy-Northwater complex, 25 to 65 percent slopes, very bouldery
74	Winnemucca-Castino loams, 1 to 10 percent slopes, stony
75	Wrayha-Rabbitex-Veatch complex, 45 to 65 percent slopes, very stony
76	Wrayha-Veatch-Rabbitex complex, 12 to 45 percent slopes
77	Yamo, moist-Redcreek complex, 3 to 25 percent slopes
78	Youngston loam, 1 to 6 percent slopes
79	Water

CONVENTIONAL AND SPECIAL SYMBOLS LEGEND

CULTURAL FEATURES

BOUNDARIES

- National, state, or province
- County or parish
- Minor civil division
- Reservation (national forest or park, state forest or park, and large airport)
- Land grant
- Limit of soil survey (label)
- Field sheet matchline and neatline

AD HOC BOUNDARY (label)

- Small airport, airfield, park, oilfield, cemetery, or flood pool

STATE COORDINATE TICK
1 890 000 FEET

LAND DIVISION CORNER (sections and land grants)

ROADS

- Divided (median shown if scale permits)
- Other roads
- Trail

ROAD EMBLEM & DESIGNATIONS

- Interstate — 173
- Federal — 287
- State — 52

DAMS

- Medium or Small (Named where applicable)

PITS

- Gravel pit

MISCELLANEOUS CULTURAL FEATURES

- School
- Located object (label) — Tower
- Windmill

WATER FEATURES

DRAINAGE

- Perennial, double line
- Perennial, single line
- Intermittent
- Canals or ditches
- Perennial drainage and/or irrigation ditch

MISCELLANEOUS WATER FEATURES

- Marsh or swamp
- Spring
- Wet spot

SPECIAL SYMBOLS FOR SOIL SURVEY

SOIL DELINEATIONS AND SYMBOLS — 57 65

ESCARPMENTS

- Bedrock (points down slope)
- Other than bedrock (points down slope)

GULLY

MISCELLANEOUS

- Clay spot
- Gravelly spot
- Rock outcrop (includes sandstone and shale)
- Saline spot
- Slide or slip (tips point upslope)
- Stony spot, very stony spot

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

DOUGLAS PLATEAU AREA, PARTS OF GARFIELD AND MESA COUNTIES, COLORADO
DAVIS CANYON QUADRANGLE
SHEET NUMBER 1 OF 46

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from 1993 aerial photography.

North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 12. Coordinate grid ticks and land division data, if shown, are approximately positioned, and in some cases may be projected in areas not surveyed. Digital data are available for this quadrangle.

NORTH

QUADRANGLE LOCATION

SCALE 1:24000

KILOMETERS

FEET

MILES

1	2	3	1 RAINBOW
4		5	2 DRAGON
6	7	8	3 TEXAS CREEK

4 BURNT TIMBER CANYON
5 EAST EVACUATION CREEK
6 TOM PATTERSON CANYON
7 RATHOLE RIDGE
8 BAXTER PASS

INDEX TO ADJOINING 7.5 MAPS

DAVIS CANYON, COLORADO
7.5 MINUTE SERIES
SHEET NUMBER 1 OF 46

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NORTH

QUADRANGLE LOCATION

SCALE 1:24000

KILOMETERS

FEET

MILES

1	2	3
4		5
6	7	8

1 DRAGON
2 TEXAS CREEK
3 TEXAS MOUNTAIN
4 DAVIS CANYON
5 BIG FOUNDATION CREEK
6 RAT HOLE RIDGE
7 BAXTER PASS
8 DOUGLAS PASS

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EAST EVACUATION CREEK, COLORADO
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UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

DOUGLAS PLATEAU AREA, PARTS OF GARFIELD
AND MESA COUNTIES, COLORADO
BIG FOUNDATION CREEK QUADRANGLE
SHEET NUMBER 3 OF 46

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NORTH

QUADRANGLE LOCATION

SCALE 1:24000

1 0 1
KILOMETERS

1000 0 1000 2000 3000 4000 5000 6000 7000
FEET

1 0 1
MILES

1	2	3
4		5
6	7	8

1 TEXAS CREEK
2 TEXAS MOUNTAIN
3 WHITE COYOTE DRAW
4 EAST EVACUATION CREEK
5 BRUSHY POINT
6 BAXTER PASS
7 DOUGLAS PASS
8 CALF CANYON

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BIG FOUNDATION CREEK, COLORADO
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DOUGLAS PLATEAU AREA, PARTS OF GARFIELD
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BRUSHY POINT QUADRANGLE
SHEET NUMBER 4 OF 46

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NORTH

QUADRANGLE LOCATION

SCALE 1:24000

KILOMETERS

FEET

MILES

1	2	3	
4		5	
6	7	8	

1 TEXAS MOUNTAIN
2 WHITE COYOTE DRAW
3 BLACK CABIN GULCH
4 BIG FOUNDATION CREEK
5 RAZORBACK RIDGE
6 DOUGLAS PASS
7 CALF CANYON
8 HENDERSON RIDGE

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BRUSHY POINT, COLORADO
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DOUGLAS PLATEAU AREA, PARTS OF GARFIELD
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RAZORBACK RIDGE QUADRANGLE
SHEET NUMBER 5 OF 46

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NORTH

QUADRANGLE LOCATION

SCALE 1:24000

KILOMETERS

FEET

MILES

1	2	3
4		5
6	7	8

1 WHITE COYOTE DRAW
2 BLACK CABIN GULCH
3 YANKEE GULCH
4 BRUSHY POINT
5 FIGURE FOUR SPRING
6 CALF CANYON
7 HENDERSON RIDGE
8 DESERT GULCH

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RAZORBACK RIDGE, COLORADO
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DOUGLAS PLATEAU AREA, PARTS OF GARFIELD
AND MESA COUNTIES, COLORADO
FIGURE FOUR SPRING QUADRANGLE
SHEET NUMBER 6 OF 46

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NORTH

QUADRANGLE LOCATION

SCALE 1:24000

KILOMETERS

FEET

MILES

1	2	3
4		5
6	7	8

1 BLACK CABIN GULCH
2 YANKEE GULCH
3 ROCK SCHOOL
4 RAZORBACK RIDGE
5 BULL FORK
6 HENDERSON RIDGE
7 DESERT GULCH
8 MOUNT BLAINE

INDEX TO ADJOINING 7.5 MAPS

FIGURE FOUR SPRING, COLORADO
7.5 MINUTE SERIES
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UNITED STATES
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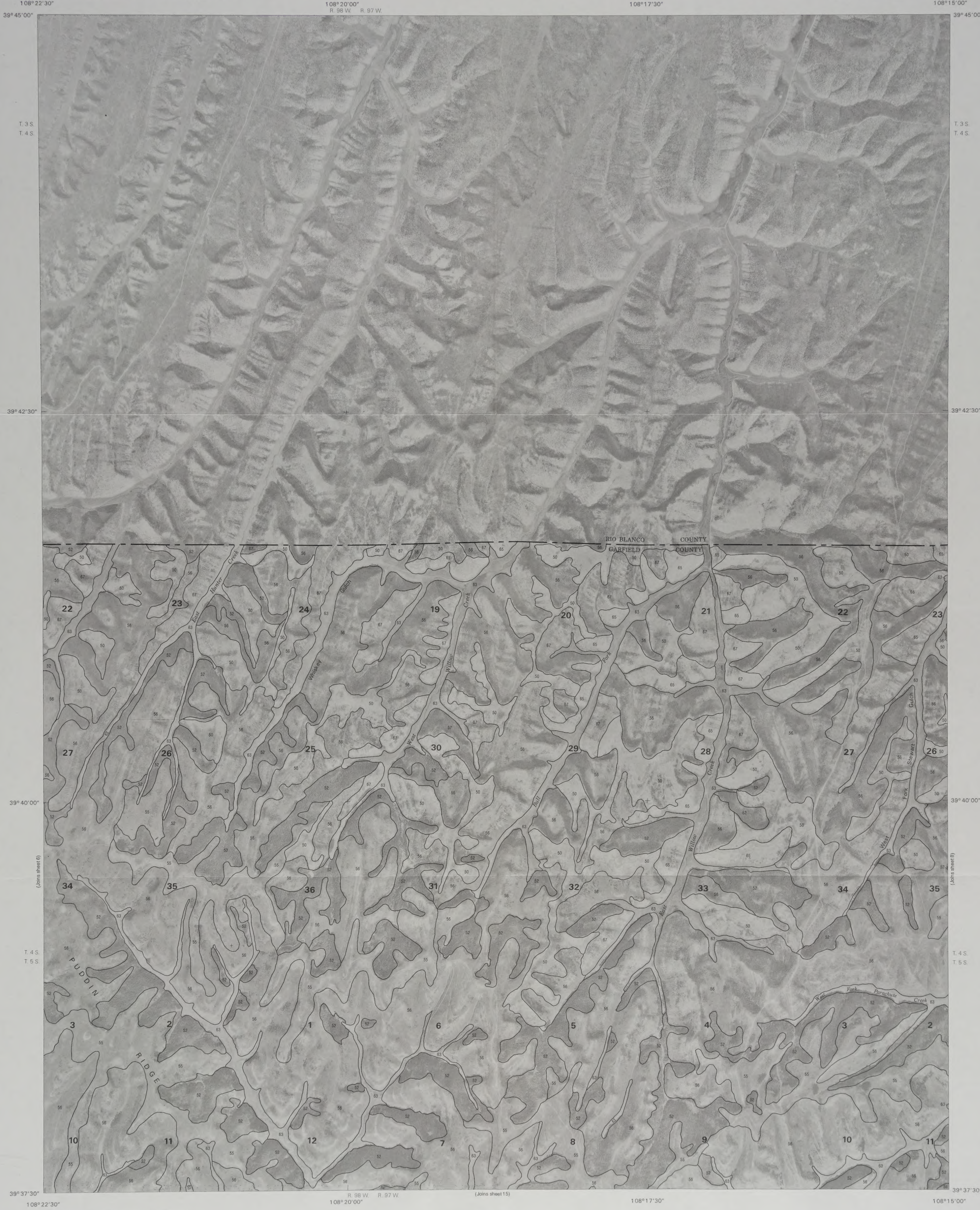

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NORTH

QUADRANGLE LOCATION

SCALE 1:24000

KILOMETERS

1000 0 1000 2000 3000 4000 5000 6000 7000

FEET

MILES

1	2	3
4		5
6	7	8

1 YANKEE GULCH
2 ROCK SCHOOL
3 JESSUP GULCH
4 FIGURE FOUR SPRING
5 CUTOFF GULCH
6 DESERT GULCH
7 MOUNT BLAINE
8 CIRCLE DOT GULCH

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BULL FORK, COLORADO
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UNITED STATES
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NATURAL RESOURCES CONSERVATION SERVICE

DOUGLAS PLATEAU AREA, PARTS OF GARFIELD
AND MESA COUNTIES, COLORADO
CUTOFF GULCH QUADRANGLE
SHEET NUMBER 8 OF 46

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NORTH

QUADRANGLE LOCATION

SCALE 1:24000

KILOMETERS

FEET

MILES

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1 ROCK SCHOOL
2 JESSUP GULCH
3 NO NAME RIDGE
4 BULL FORK
5 MCCARTHY GULCH
6 MOUNT BLAINE
7 CIRCLE DOT GULCH
8 FORKED GULCH

CUTOFF GULCH, COLORADO
7.5 MINUTE SERIES
SHEET NUMBER 8 OF 46

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

DOUGLAS PLATEAU AREA, PARTS OF GARFIELD
AND MESA COUNTIES, COLORADO
RAT HOLE RIDGE QUADRANGLE
SHEET NUMBER 9 OF 46

109° 07'30" 109° 05'00" R. 25 E. R. 26 E. R. 104 W. 109° 02'30" (Joins sheet 1) R. 104 W. R. 103 W. 109° 00'00"

39° 37'30"

39° 35'00"

39° 32'30"

39° 30'00"

109° 07'30" 109° 05'00" R. 25 E. R. 26 E. R. 105 W. 109° 02'30" R. 104 W. (Joins sheet 17) 109° 00'00"

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from 1993 serial photography.

North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 12. Coordinate grid ticks and land division data, if shown, are approximately positioned, and in some cases may be projected in areas not surveyed. Digital data are available for this quadrangle.

NORTH

QUADRANGLE LOCATION

SCALE 1:24000

KILOMETERS

FEET

MILES

1 BURNT TIMBER CANYON
2 DAVIS CANYON
3 EAST EVACUATION CREEK
4 TOM PATTERSON CANYON
5 BAXTER PASS
6 SAN ARROYO RIDGE
7 JIM CANYON
8 CARBONERA

INDEX TO ADJOINING 7.5 MAPS

RAT HOLE RIDGE, COLORADO
7.5 MINUTE SERIES
SHEET NUMBER 9 OF 46

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

DOUGLAS PLATEAU AREA, PARTS OF GARFIELD AND MESA COUNTIES, COLORADO
BAXTER PASS QUADRANGLE
SHEET NUMBER 10 OF 46

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from 1993 aerial photography.

North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 12. Coordinate grid ticks and land division data, if shown, are approximately positioned, and in some cases may be projected in areas not surveyed. Digital data are available for this quadrangle.

NORTH

QUADRANGLE LOCATION

SCALE 1:24000

KILOMETERS

FEET

MILES

1	2	3
4		5
6	7	8

1 DAVIS CANYON
2 EAST EVACUATION CREEK
3 BIG FOUNDATION CREEK
4 RAT HOLE RIDGE
5 DOUGLAS PASS
6 JIM CANYON
7 CARBONERA
8 HOWARD CANYON

INDEX TO ADJOINING 7.5 MAPS

BAXTER PASS, COLORADO
7.5 MINUTE SERIES
SHEET NUMBER 10 OF 46

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

DOUGLAS PLATEAU AREA, PARTS OF GARFIELD AND MESA COUNTIES, COLORADO
DOUGLAS PASS QUADRANGLE

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North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 12. Coordinate grid ticks and land division data, if shown, are approximately positioned, and in some cases may be projected in areas not surveyed. Digital data are available for this quadrangle.

NORTH

QUADRANGLE LOCATION

SCALE 1:24000

1 0 1 KILOMETERS

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 0 1 MILES

1	2	3
4		5
6	7	8

1 EAST EVACUATION CREEK
2 BIG FOUNDATION CREEK
3 BRUSHY POINT
4 BAXTER PASS
5 CALF CANYON
6 CARBONERA
7 HOWARD CANYON
8 GARVEY CANYON

INDEX TO ADJOINING 7.5 MAPS

DOUGLAS PASS, COLORADO
7.5 MINUTE SERIES
SHEET NUMBER 11 OF 46

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

DOUGLAS PLATEAU AREA, PARTS OF GARFIELD
AND MESA COUNTIES, COLORADO
CALF CANYON QUADRANGLE
SHEET NUMBER 12 OF 46

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from 1993 aerial photography.

North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 12. Coordinate grid ticks and land division data, if shown, are approximately positioned, and in some cases may be projected in areas not surveyed. Digital data are available for this quadrangle.

NORTH

QUADRANGLE LOCATION

SCALE 1:24000

1 0 1
KILOMETERS

1000 0 1000 2000 3000 4000 5000 6000 7000
FEET

1 0 1
MILES

DOUGLAS PLATEAU AREA, COLORADO NO. 12

1	2	3
4		5
6	7	8

1 BIG FOUNDATION CREEK
2 BRUSHY POINT
3 RAZORBACK RIDGE
4 DOUGLAS PASS
5 HENDERSON RIDGE
6 HOWARD CANYON
7 GARVEY CANYON
8 MIDDLE DRY FORK

INDEX TO ADJOINING 7.5 MAPS

CALF CANYON, COLORADO
7.5 MINUTE SERIES
SHEET NUMBER 12 OF 46

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

DOUGLAS PLATEAU AREA, PARTS OF GARFIELD
AND MESA COUNTIES, COLORADO
HENDERSON RIDGE QUADRANGLE
SHEET NUMBER 13 OF 46

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from 1993 aerial photography.

North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 12. Coordinate grid ticks and land division data, if shown, are approximately positioned, and in some cases may be projected in areas not surveyed. Digital data are available for this quadrangle.

NORTH

QUADRANGLE LOCATION

SCALE 1:24000

KILOMETERS

FEET

MILES

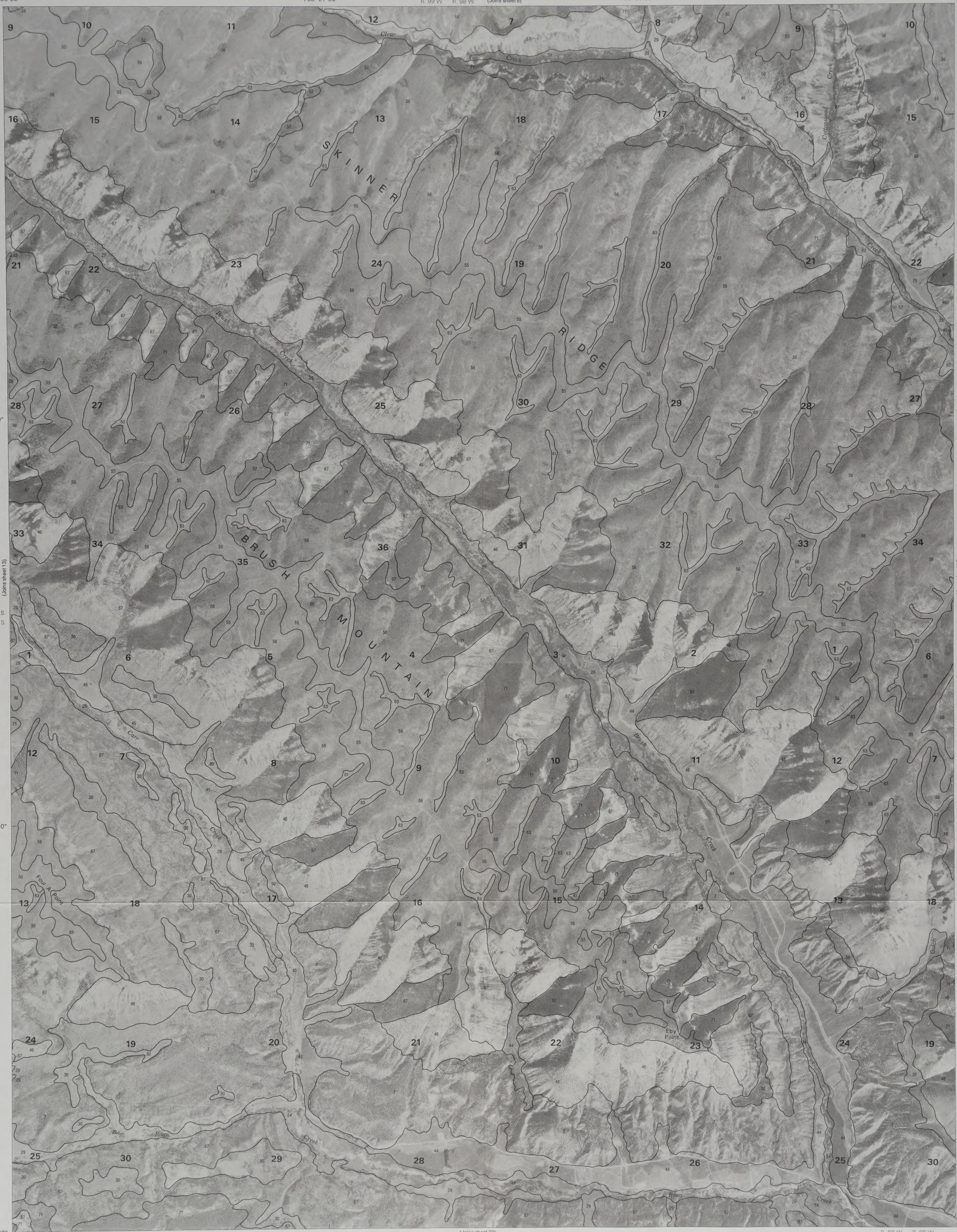
1	2	3
4		5
6	7	8

1 BRUSHY POINT
2 RAZORBACK RIDGE
3 FIGURE FOUR SPRING
4 CALF CANYON
5 DESERT GULCH
6 GARVEY CANYON
7 MIDDLE DRY FORK
8 THE SADDLE

INDEX TO ADJOINING 7.5 MAPS

HENDERSON RIDGE, COLORADO
7.5 MINUTE SERIES
SHEET NUMBER 13 OF 46

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE



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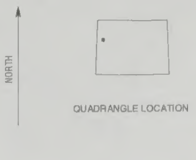
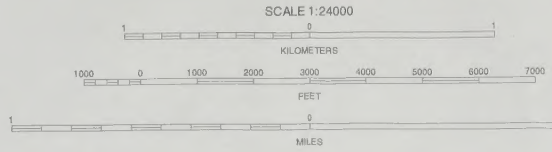
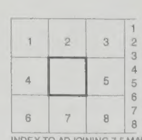
North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse,Mercator, zone 12. Coordinate grid ticks and land division data, if shown, are approximately positioned, and in some cases may be projected in areas not surveyed. Digital data are available for this quadrangle.







1 RAZORBACK RIDGE
2 FIGURE FOUR SPRING
3 BULL FORK
4 HENDERSON RIDGE
5 MOUNT BLAINE
6 MIDDLE DRY FORK
7 THE SADDLE
8 LONG POINT

INDEX TO ADJOINING 7.5 MAPS

DESERT GULCH, COLORADO

7.5 MINUTE SERIES
SHEET NUMBER 14 OF 46

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

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NORTH

QUADRANGLE LOCATION

SCALE 1:24000

KILOMETERS

FEET

MILES

1 FIGURE FOUR SPRING
2 BULL FORK
3 CUTOFF GULCH
4 DESERT GULCH
5 CIRCLE DOT GULCH
6 THE SADDLE
7 LONG POINT
8 RED PINNACLE

INDEX TO ADJOINING 7.5 MAPS

MOUNT BLAINE, COLORADO
7.5 MINUTE SERIES
SHEET NUMBER 15 OF 46

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

DOUGLAS PLATEAU AREA, PARTS OF GARFIELD
AND MESA COUNTIES, COLORADO
CIRCLE DOT GULCH QUADRANGLE
SHEET NUMBER 16 OF 46

108°15'00" 108°12'30" 108°10'00" 108°07'30"

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North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 12. Coordinate grid ticks and land division data, if shown, are approximately positioned, and in some cases may be projected in areas not surveyed. Digital data are available for this quadrangle.

NORTH

QUADRANGLE LOCATION

SCALE 1:24000

KILOMETERS

FEET

MILES

1	2	3
4		5
6	7	8

1 BULL FORK
2 CUTOFF GULCH
3 MCCARTHY GULCH
4 MOUNT BLAINE
5 FORKED GULCH
6 LONG POINT
7 RED PINNACLE
8 PARACHUTE

INDEX TO ADJOINING 7.5 MAPS

CIRCLE DOT GULCH, COLORADO
7.5 MINUTE SERIES
SHEET NUMBER 16 OF 46

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

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NORTH

QUADRANGLE LOCATION

SCALE 1:24000

KILOMETERS

FEET

MILES

1	2	3
4		5
6	7	8

1 TOM PATTERSON CANYON
2 RAT HOLE RIDGE
3 BAXTER PASS
4 SAN ARROYO RIDGE
5 CARBONERA
6 BRYSON CANYON
7 BAR X WASH
8 BADGER WASH

INDEX TO ADJOINING 7.5 MAPS

JIM CANYON, COLORADO
7.5 MINUTE SERIES
SHEET NUMBER 17 OF 46

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

DOUGLAS PLATEAU AREA, PARTS OF GARFIELD
AND MESA COUNTIES, COLORADO
CARBONERA QUADRANGLE
SHEET NUMBER 18 OF 46

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NORTH

QUADRANGLE LOCATION

SCALE 1:24000

1 0 1
KILOMETERS

1000 0 1000 2000 3000 4000 5000 6000 7000
FEET

1 0 1
MILES

1	2	3
4		5
6	7	8

1 RAT HOLE RIDGE
2 BAXTER PASS
3 DOUGLAS PASS
4 JIM CANYON
5 HOWARD CANYON
6 BAR X WASH
7 BADGER WASH
8 HIGHLINE LAKE

INDEX TO ADJOINING 7.5 MAPS

CARBONERA, COLORADO
7.5 MINUTE SERIES
SHEET NUMBER 18 OF 46

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

DOUGLAS PLATEAU AREA, PARTS OF GARFIELD AND MESA COUNTIES, COLORADO
HOWARD CANYON QUADRANGLE
SHEET NUMBER 19 OF 46

108° 52' 30" 39° 30' 00" — 108° 50' 00" — R. 103 W. R. 102 W. (Joins sheet 11) — 108° 47' 30" — 108° 45' 00" 39° 30' 00"

39° 22' 30" 108° 52' 30" — 108° 50' 00" — R. 103 W. R. 102 W. (Joins sheet 27) — 108° 47' 30" — 39° 22' 30" 108° 45' 00"

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NORTH

QUADRANGLE LOCATION

SCALE 1:24000

KILOMETERS

FEET

MILES

INDEX TO ADJOINING 7.5 MAPS
1 BAXTER PASS
2 DOUGLAS PASS
3 CALF CANYON
4 CARBONERA
5 GARVEY CANYON
6 BADGER WASH
7 HIGHLINE LAKE
8 RUBY LEE RESERVOIR

HOWARD CANYON, COLORADO
7.5 MINUTE SERIES
SHEET NUMBER 19 OF 46

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

DOUGLAS PLATEAU AREA, PARTS OF GARFIELD
AND MESA COUNTIES, COLORADO
GARVEY CANYON QUADRANGLE
SHEET NUMBER 20 OF 46

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from 1993 aerial photography.

North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 12. Coordinate grid ticks and land division data, if shown, are approximately positioned, and in some cases may be projected in areas not surveyed. Digital data are available for this quadrangle.

NORTH

QUADRANGLE LOCATION

SCALE 1:24000

KILOMETERS

FEET

MILES

1	2	3
4		5
6	7	8

1 DOUGLAS PASS
2 CALF CANYON
3 HENDERSON RIDGE
4 HOWARD CANYON
5 MIDDLE DRY FORK
6 HIGHLINE LAKE
7 RUBY LEE RESERVOIR
8 CORCORAN PEAK

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GARVEY CANYON, COLORADO
7.5 MINUTE SERIES
SHEET NUMBER 20 OF 46

#1108900024 ID: 88076607

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

DOUGLAS PLATEAU AREA, PARTS OF GARFIELD AND MESA COUNTIES, COLORADO
MIDDLE DRY FORK QUADRANGLE
SHEET NUMBER 21 OF 46

108°37'30" R. 101 W. R. 100 W. 108°35'00" (Joins sheet 13) 108°32'30" 108°30'00"
39°30'00"

39°22'30"
108°37'30" R. 101 W. R. 100 W. 108°35'00" (Joins sheet 29) 108°32'30" 108°30'00"

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North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 12. Coordinate grid ticks and land division data, if shown, are approximately positioned, and in some cases may be projected in areas not surveyed. Digital data are available for this quadrangle.

NORTH

QUADRANGLE LOCATION

SCALE 1:24000

KILOMETERS 1 0 1

FEET 1000 0 1000 2000 3000 4000 5000 6000 7000

MILES 1 0 1

DOUGLAS PLATEAU AREA, COLORADO NO. 21

1	2	3
4		5
6	7	8

1 CALF CANYON
2 HENDERSON RIDGE
3 DESERT GULCH
4 GARVEY CANYON
5 THE SADDLE
6 RUBY LEE RESERVOIR
7 CORCORAN PEAK
8 WINTER FLATS

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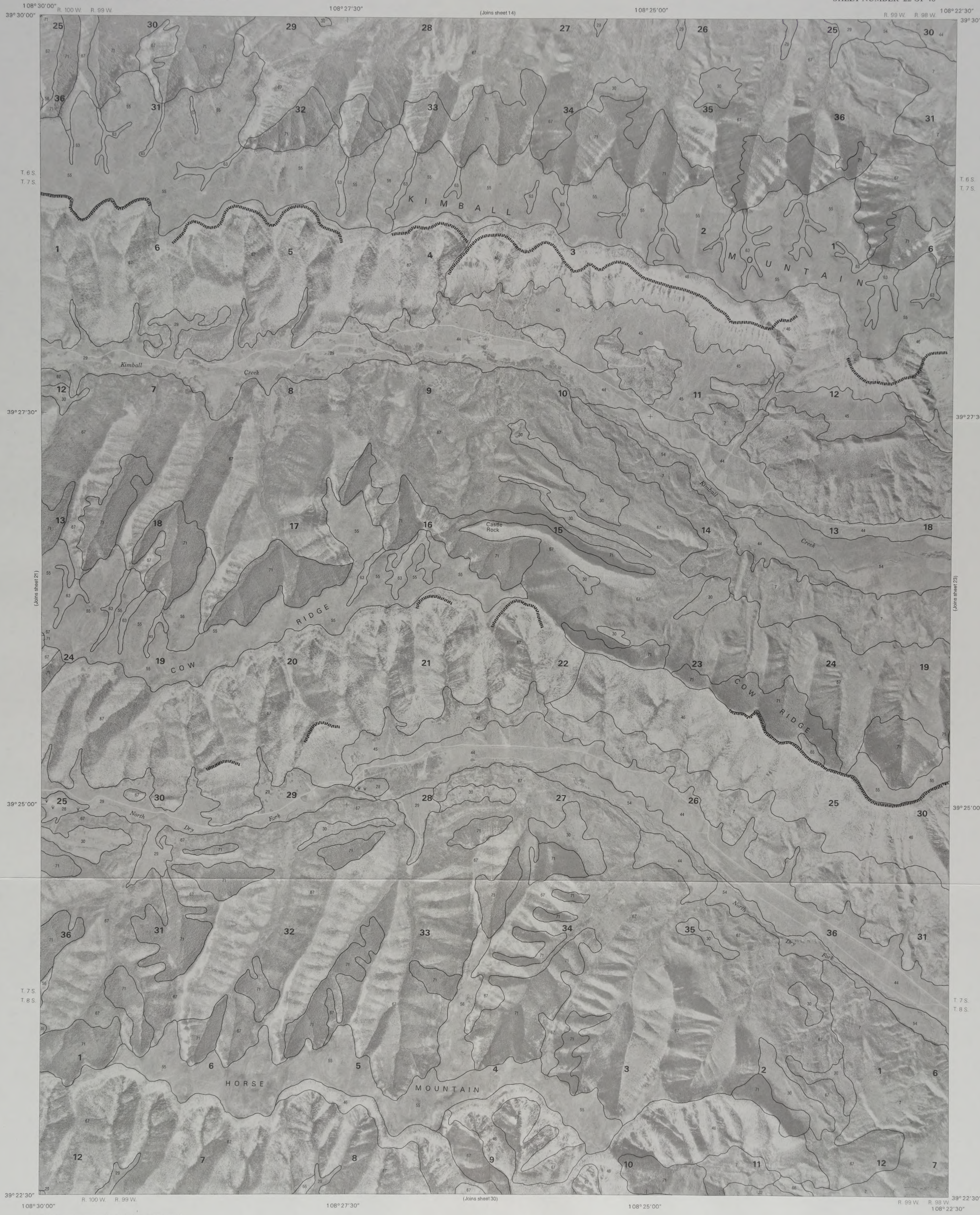
MIDDLE DRY FORK, COLORADO
7.5 MINUTE SERIES
SHEET NUMBER 21 OF 46

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE



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North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 12. Coordinate grid ticks and land division data, if shown, are approximately positioned, and in some cases may be projected in areas not surveyed. Digital data are available for this quadrangle.

NORTH

QUADRANGLE LOCATION

SCALE 1:24000

KILOMETERS

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

MILES

1	2	3
4		5
6	7	8

1 HENDERSON RIDGE
2 DESERT GULCH
3 MOUNT BLAINE
4 MIDDLE DRY FORK
5 LONG POINT
6 CORCORAN PEAK
7 WINTER FLATS
8 WAGON TRACK RIDGE

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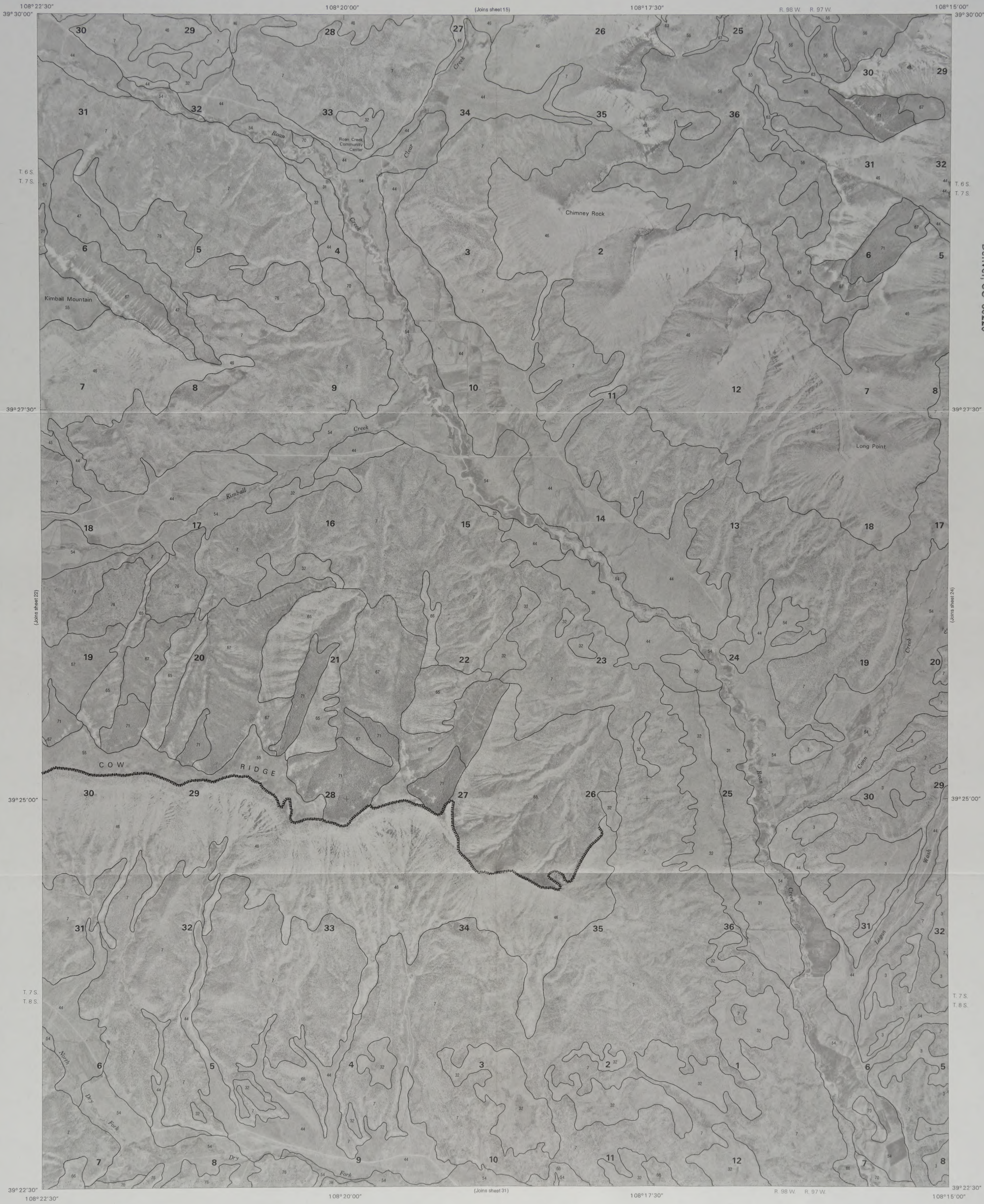
THE SADDLE, COLORADO
7.5 MINUTE SERIES
SHEET NUMBER 22 OF 46

1108900024 ID: 88076607

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE



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North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 12. Coordinate grid ticks and land division data, if shown, are approximately positioned, and in some cases may be projected in areas not surveyed. Digital data are available for this quadrangle.

NORTH

QUADRANGLE LOCATION

SCALE 1:24000

KILOMETERS

FEET

MILES

1	2	3
4		5
6	7	8

1 DESERT GULCH
2 MOUNT BLAINE
3 CIRCLE DOT GULCH
4 THE SADDLE
5 RED PINNACLE
6 WINTER FLATS
7 WAGON TRACK RIDGE
8 DE BEQUE

INDEX TO ADJOINING 7.5 MAPS

LONG POINT, COLORADO
7.5 MINUTE SERIES
SHEET NUMBER 23 OF 46

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

DOUGLAS PLATEAU AREA, PARTS OF GARFIELD
AND MESA COUNTIES, COLORADO
RED PINNACLE QUADRANGLE
SHEET NUMBER 24 OF 46

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North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 12. Coordinate grid ticks and land division data, if shown, are approximately positioned, and in some cases may be projected in areas not surveyed. Digital data are available for this quadrangle.

NORTH

QUADRANGLE LOCATION

SCALE 1:24000

KILOMETERS

FEET

MILES

1	2	3	
4		5	
6	7	8	

1 MOUNT BLAINE
2 CIRCLE DOT GULCH
3 FORKED GULCH
4 LONG POINT
5 PARACHUTE
6 WAGON TRACK RIDGE
7 DE BEQUE
8 HOUSETOP MOUNTAIN

INDEX TO ADJOINING 7.5 MAPS

RED PINNACLE, COLORADO
7.5 MINUTE SERIES
SHEET NUMBER 24 OF 46

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

1108900024

ID: 88076607

DOUGLAS PLATEAU AREA, PARTS OF GARFIELD
AND MESA COUNTIES, COLORADO
BAR X WASH QUADRANGLE
SHEET NUMBER 25 OF 46

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from 1993 aerial photography.

North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 12. Coordinate grid ticks and land division data, if shown, are approximately positioned, and in some cases may be projected in areas not surveyed. Digital data are available for this quadrangle.

NORTH

QUADRANGLE LOCATION

SCALE 1:24000

KILOMETERS

FEET

MILES

DOUGLAS PLATEAU AREA, COLORADO NO. 25

1	2	3
4		5
6	7	8

1 SAN ARROYO RIDGE
2 JIM CANYON
3 CARBONERA
4 BRYSON CANYON
5 BADGER WASH
6 HARLEY DOME
7 BITTER CREEK WELL
8 RUBY CANYON

INDEX TO ADJOINING 7.5 MAPS

BAR X WASH, COLORADO
7.5 MINUTE SERIES
SHEET NUMBER 25 OF 46

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

DOUGLAS PLATEAU AREA, PARTS OF GARFIELD AND MESA COUNTIES, COLORADO
BADGER WASH QUADRANGLE
SHEET NUMBER 26 OF 46

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North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 12. Coordinate grid ticks and land division data, if shown, are approximately positioned, and in some cases may be projected in areas not surveyed. Digital data are available for this quadrangle.

NORTH

QUADRANGLE LOCATION

SCALE 1:24000

1 0 1
KILOMETERS

1000 0 1000 2000 3000 4000 5000 6000 7000
FEET

1 0 1
MILES

1	2	3
4		5
6	7	8

1 JIM CANYON
2 CARBONERA
3 HOWARD CANYON
4 BAR X WASH
5 HIGHLINE LAKE
6 BITTER CREEK WELL
7 RUBY CANYON
8 MACK

INDEX TO ADJOINING 7.5 MAPS

BADGER WASH, COLORADO
7.5 MINUTE SERIES
SHEET NUMBER 26 OF 46

#1168900024

ID: 88076607

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

DOUGLAS PLATEAU AREA, PARTS OF GARFIELD
AND MESA COUNTIES, COLORADO
HIGHLINE LAKE QUADRANGLE
SHEET NUMBER 27 OF 46

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North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 12. Coordinate grid ticks and land division data, if shown, are approximately positioned, and in some cases may be projected in areas not surveyed. Digital data are available for this quadrangle.

NORTH

QUADRANGLE LOCATION

SCALE 1:24000

1 0 1
KILOMETERS

1000 0 1000 2000 3000 4000 5000 6000 7000
FEET

1 0 1
MILES

DOUGLAS PLATEAU AREA, COLORADO NO. 27

1	2	3
4		5
6	7	8

1 CARBONERA
2 HOWARD CANYON
3 GARVEY CANYON
4 BADGER WASH
5 RUBY LEE RESERVOIR
6 RUBY CANYON
7 MACK
8 FRUITA

INDEX TO ADJOINING 7.5 MAPS

HIGHLINE LAKE, COLORADO
7.5 MINUTE SERIES
SHEET NUMBER 27 OF 46

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

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North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 12. Coordinate grid ticks and land division data, if shown, are approximately positioned, and in some cases may be projected in areas not surveyed. Digital data are available for this quadrangle.

NORTH

QUADRANGLE LOCATION

SCALE 1:24000

KILOMETERS

FEET

MILES

1	2	3
4		5
6	7	8

1 HOWARD CANYON
2 GARVEY CANYON
3 MIDDLE DRY FORK
4 HIGHLINE LAKE
5 CORCORAN PEAK
6 MACK
7 FRUITA
8 CORCORAN POINT

INDEX TO ADJOINING 7.5 MAPS

RUBY LEE RESERVOIR, COLORADO
7.5 MINUTE SERIES
SHEET NUMBER 28 OF 46

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

DOUGLAS PLATEAU AREA, PARTS OF GARFIELD AND MESA COUNTIES, COLORADO
CORCORAN PEAK QUADRANGLE
SHEET NUMBER 29 OF 46

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NORTH

QUADRANGLE LOCATION

SCALE 1:24000

KILOMETERS

FEET

MILES

1	2	3	1 GARVEY CANYON
4		5	2 MIDDLE DRY FORK
6	7	8	3 THE SADDLE

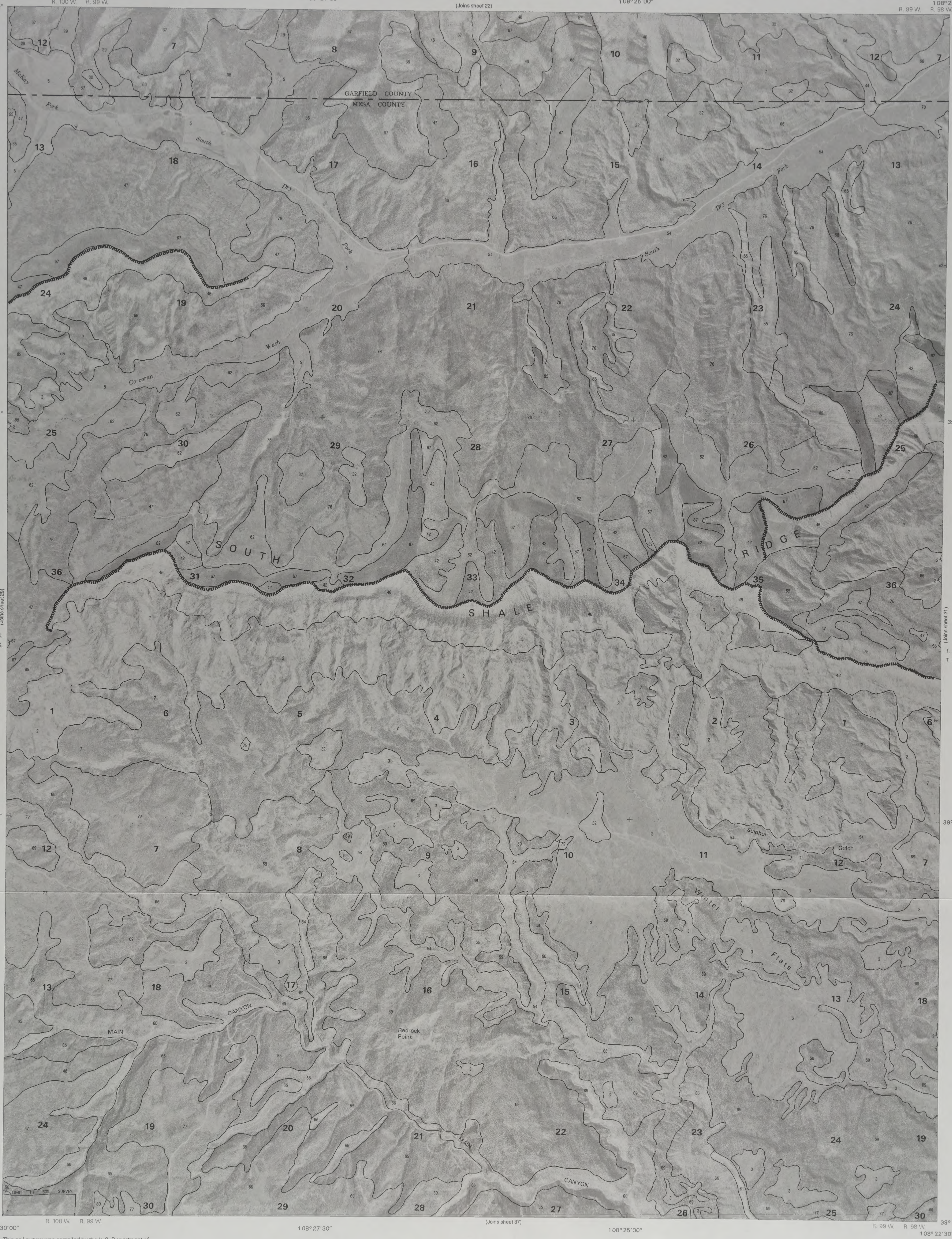
4 RUBY LEE RESERVOIR
5 WINTER FLATS
6 FRUITA
7 CORCORAN POINT
8 ROUND MOUNTAIN

INDEX TO ADJOINING 7.5 MAPS

CORCORAN PEAK, COLORADO
7.5 MINUTE SERIES
SHEET NUMBER 29 OF 46

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

DOUGLAS PLATEAU AREA, PARTS OF GARFIELD
AND MESA COUNTIES, COLORADO
WINTER FLATS QUADRANGLE
SHEET NUMBER 30 OF 46



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NORTH

QUADRANGLE LOCATION

SCALE 1:24000

KILOMETERS

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

MILES

1	2	3
4		5
6	7	8

1 MIDDLE DRY FORK
2 THE SADDLE
3 LONG POINT
4 CORCORAN PEAK
5 WAGON TRACK RIDGE
6 CORCORAN POINT
7 ROUND MOUNTAIN
8 CAMEO

INDEX TO ADJOINING 7.5 MAPS

WINTER FLATS, COLORADO
7.5 MINUTE SERIES
SHEET NUMBER 30 OF 46

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

DOUGLAS PLATEAU AREA, PARTS OF GARFIELD AND MESA COUNTIES, COLORADO
WAGON TRACK RIDGE QUADRANGLE
SHEET NUMBER 31 OF 46

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NORTH

QUADRANGLE LOCATION

SCALE 1:24000

KILOMETERS

FEET

MILES

1	2	3
4		5
6	7	8

1 THE SADDLE
2 LONG POINT
3 RED PINNACLE
4 WINTER FLATS
5 DE BEQUE
6 ROUND MOUNTAIN
7 CAMEO
8 MESA

INDEX TO ADJOINING 7.5 MAPS

WAGON TRACK RIDGE, COLORADO
7.5 MINUTE SERIES
SHEET NUMBER 31 OF 46

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

DOUGLAS PLATEAU AREA, PARTS OF GARFIELD AND MESA COUNTIES, COLORADO
DE BEQUE QUADRANGLE
SHEET NUMBER 32 OF 46

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North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 12. Coordinate grid ticks and land division data, if shown, are approximately positioned, and in some cases may be projected in areas not surveyed. Digital data are available for this quadrangle.

NORTH

QUADRANGLE LOCATION

SCALE 1:24000

KILOMETERS

FEET

MILES

1 LONG POINT
2 RED PINNACLE
3 PARACHUTE
4 WAGON TRACK RIDGE
5 HOUSETOP MOUNTAIN
6 CAMEO
7 MESA
8 MOLINA

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DE BEQUE, COLORADO
7.5 MINUTE SERIES
SHEET NUMBER 32 OF 46

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

DOUGLAS PLATEAU AREA, PARTS OF GARFIELD AND MESA COUNTIES, COLORADO
HOUSETOP MOUNTAIN QUADRANGLE
SHEET NUMBER 33 OF 46

108° 07'30" 108° 05'00" R. 96 W. R. 95 W. 108° 02'30" 108° 00'00"
39° 22'30"

39° 20'00"
39° 17'30"
39° 15'00"
(Joins sheet 40)
R. 96 W. R. 95 W.
108° 07'30" 108° 05'00" 108° 02'30" 108° 00'00"

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NORTH

QUADRANGLE LOCATION

SCALE 1:24000
1 0 1 KILOMETERS
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 0 1 MILES

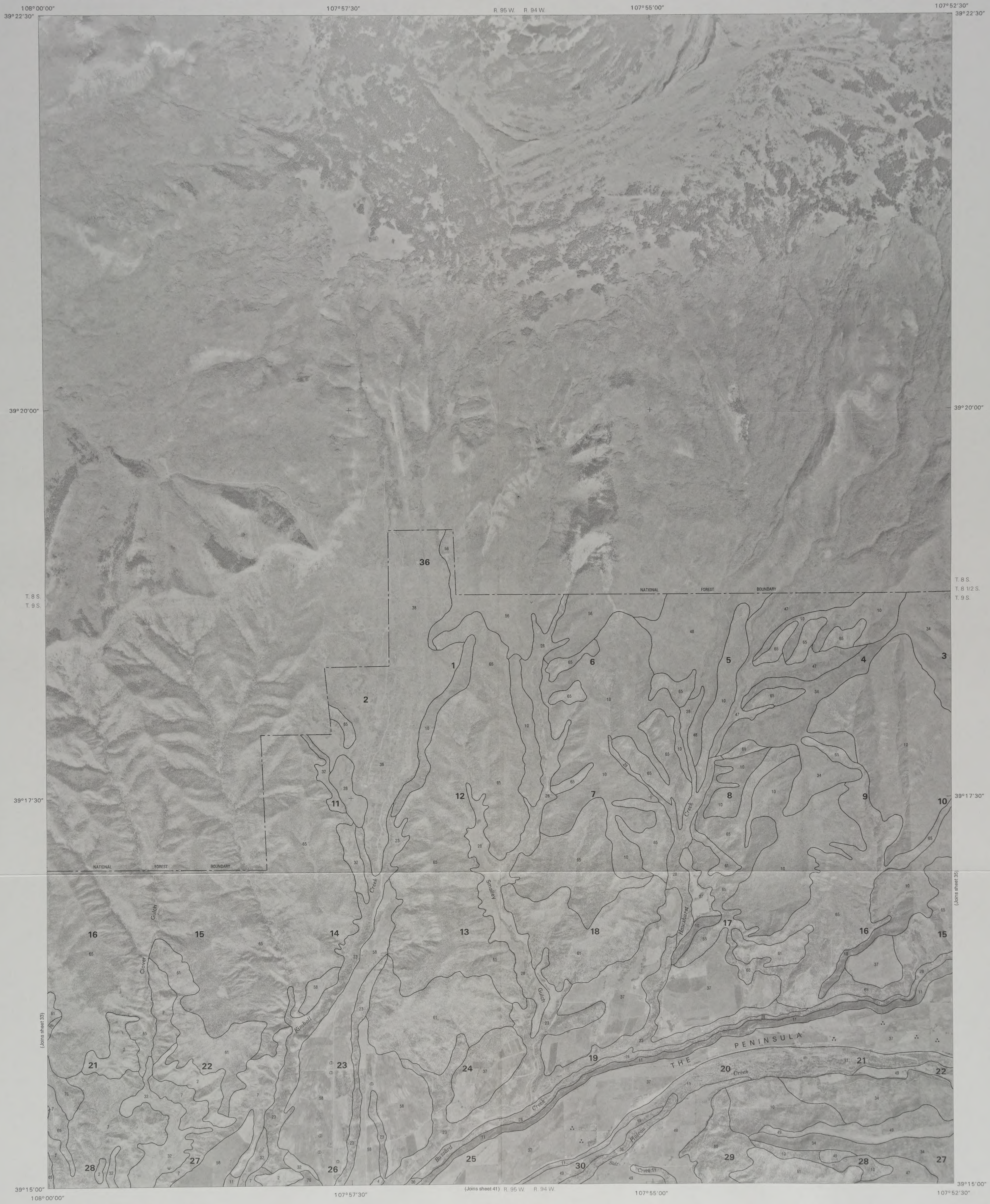
1	2	3
4		5
6	7	8

1 RED PINNACLE
2 PARACHUTE
3 RULISON
4 DE BEQUE
5 HAWXHURST CREEK
6 MESA
7 MOLINA
8 COLLBRAN

INDEX TO ADJOINING 7.5 MAPS

HOUSETOP MOUNTAIN, COLORADO
7.5 MINUTE SERIES
SHEET NUMBER 33 OF 46

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE



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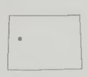
North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 13. Coordinate grid ticks and land division data, if shown, are approximately positioned, and in some cases may be projected in areas not surveyed. Digital data are available for this quadrangle.

NORTH



QUADRANGLE LOCATION

SCALE 1:24000

KILOMETERS

FEET

MILES

1	2	3
4		5
6	7	8

1 PARACHUTE
2 RULISON
3 NORTH MAMM PEAK
4 HOUSETOP MOUNTAIN
5 SOUTH MAMM PEAK
6 MOLINA
7 COLLBRAN
8 VEGA RESERVOIR

INDEX TO ADJOINING 7.5 MAPS

HAWXHURST CREEK, COLORADO
7.5 MINUTE SERIES
SHEET NUMBER 34 OF 46

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

107°52'30" 107°50'00" 107°47'30" 107°45'00"

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North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 13. Coordinate grid ticks and land division data, if shown, are approximately positioned, and in some cases may be projected in areas not surveyed. Digital data are available for this quadrangle.

NORTH

QUADRANGLE LOCATION

SCALE 1:24000

KILOMETERS

FEET

MILES

1	2	3
4		5
6	7	8

1 RULISON
2 NORTH MAMM PEAK
3 HUNTER MESA
4 HAWXHURST CREEK
5 HIGHTOWER MOUNTAIN
6 COLLBRAN
7 VEGA RESERVOIR
8 PORTER MOUNTAIN

INDEX TO ADJOINING 7.5 MAPS

SOUTH MAMM PEAK, COLORADO
7.5 MINUTE SERIES
SHEET NUMBER 35 OF 46

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NORTH

QUADRANGLE LOCATION

SCALE 1:24000

KILOMETERS

FEET

MILES

1	2	3
4		5
6	7	8

1 NORTH MAMM PEAK
2 HUNTER MESA
3 GIBSON GULCH
4 SOUTH MAMM PEAK
5 FLATIRON MOUNTAIN
6 VEGA RESERVOIR
7 PORTER MOUNTAIN
8 SPRUCE MOUNTAIN

INDEX TO ADJOINING 7.5 MAPS

HIGHTOWER MOUNTAIN, COLORADO
7.5 MINUTE SERIES
SHEET NUMBER 36 0F 46

UNITED STATES
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NORTH

QUADRANGLE LOCATION

SCALE 1:24000

1 0 1
KILOMETERS

1000 0 1000 2000 3000 4000 5000 6000 7000
FEET

1 0
MILES

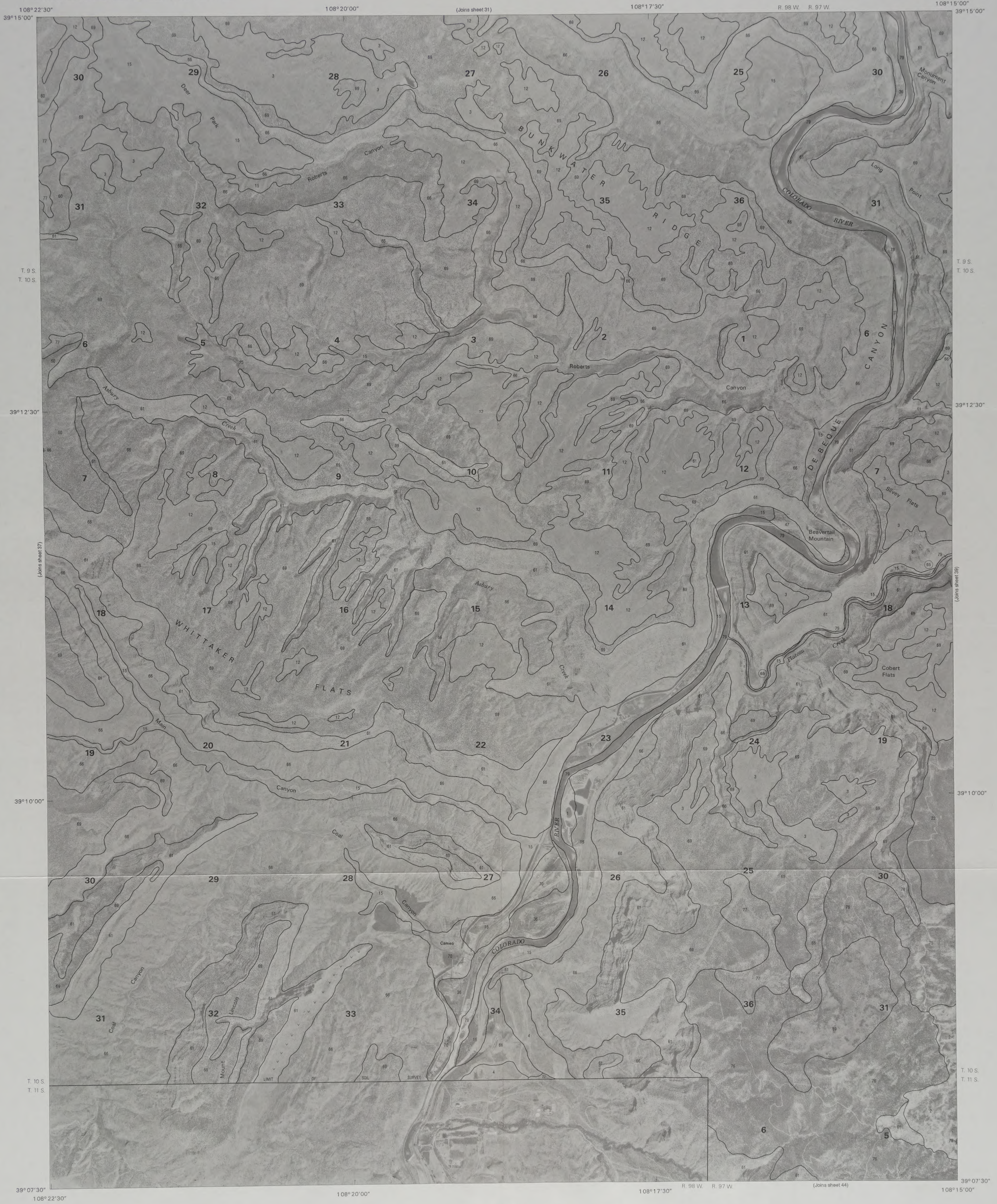
1	2	3
4		5
6	7	8

1 CORCORAN PEAK
2 WINTER FLATS
3 WAGON TRACK RIDGE
4 CORCORAN POINT
5 CAMEO
6 GRAND JUNCTION
7 CLIFTON
8 PALISADE

INDEX TO ADJOINING 7.5 MAPS

ROUND MOUNTAIN, COLORADO
7.5 MINUTE SERIES
SHEET NUMBER 37 OF 46

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE



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NORTH

QUADRANGLE LOCATION

SCALE 1:24000

1 0 1
KILOMETERS

1000 0 1000 2000 3000 4000 5000 6000 7000
FEET

1 0 1
MILES

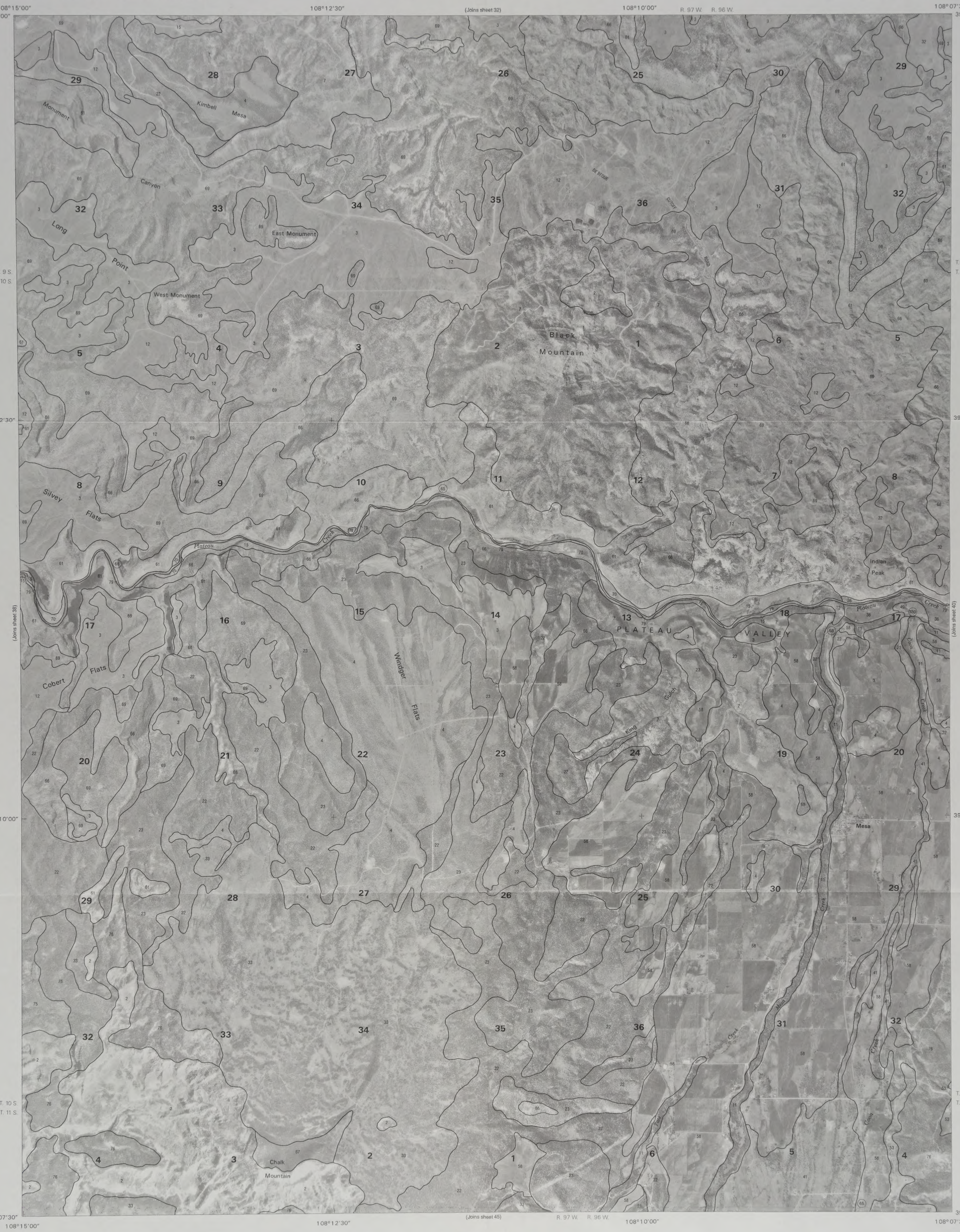
1	2	3
4		5
6	7	8

1 WINTER FLATS
2 WAGON TRACK RIDGE
3 DE BEQUE
4 ROUND MOUNTAIN
5 MESA
6 CLIFTON
7 PALISADE
8 LANDS END

INDEX TO ADJOINING 7.5 MAPS

CAMEO, COLORADO
7.5 MINUTE SERIES
SHEET NUMBER 38 OF 46

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE



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NORTH

QUADRANGLE LOCATION

SCALE 1:24000

KILOMETERS

FEET

MILES

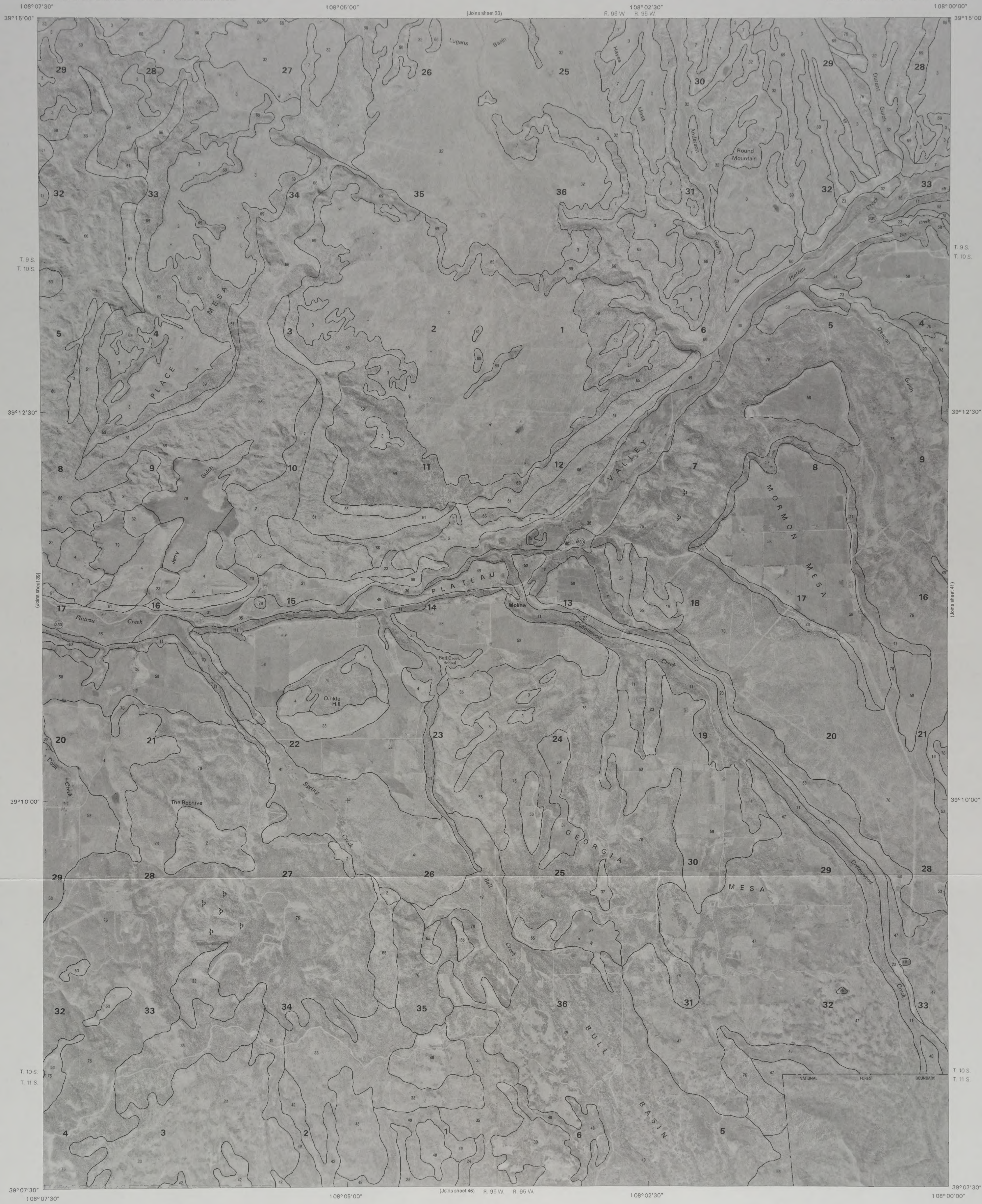
INDEX TO ADJOINING 7.5 MAPS

1 WAGON TRACK RIDGE
2 DE BEQUE
3 HOUSETOP MOUNTAIN
4 CAMEO
5 MOLINA
6 PALISADE
7 LANDS END
8 MESA LAKES

MESA, COLORADO
7.5 MINUTE SERIES
SHEET NUMBER 39 OF 46

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

DOUGLAS PLATEAU AREA, PARTS OF GARFIELD
AND MESA COUNTIES, COLORADO
MOLINA QUADRANGLE
SHEET NUMBER 40 OF 46



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North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 12. Coordinate grid ticks and land division data, if shown, are approximately positioned, and in some cases may be projected in areas not surveyed. Digital data are available for this quadrangle.

NORTH

QUADRANGLE LOCATION

SCALE 1:24000

KILOMETERS

FEET

MILES

1	2	3
4		5
6	7	8

1 DE BEQUE
2 HOUSETOP MOUNTAIN
3 HAWXHURST CREEK
4 MESA
5 COLLBRAN
6 LANDS END
7 MESA LAKES
8 GRAND MESA

INDEX TO ADJOINING 7.5 MAPS

MOLINA, COLORADO
7.5 MINUTE SERIES
SHEET NUMBER 40 OF 46

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

DOUGLAS PLATEAU AREA, PARTS OF GARFIELD AND MESA COUNTIES, COLORADO
COLLBRAN QUADRANGLE
SHEET NUMBER 41 OF 46

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NORTH

QUADRANGLE LOCATION

SCALE 1:24000

KILOMETERS

FEET

MILES

1 HOUSETOP MOUNTAIN
2 HAWXHURST CREEK
3 SOUTH MAMM PEAK
4 MOLINA
5 VEGA RESERVOIR
6 MESA LAKES
7 GRAND MESA
8 LEON PEAK

INDEX TO ADJOINING 7.5 MAPS

COLLBRAN, COLORADO
7.5 MINUTE SERIES
SHEET NUMBER 41 OF 46

UNITED STATES
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NORTH

QUADRANGLE LOCATION

SCALE 1:24000

KILOMETERS

1000 0 1000 2000 3000 4000 5000 6000 7000

FEET

MILES

1 HAWXHURST CREEK
2 SOUTH MAMM PEAK
3 HIGHTOWER MOUNTAIN
4 COLLBRAN
5 PORTER MOUNTAIN
6 GRAND MESA
7 LEON PEAK
8 CHALK MOUNTAIN

INDEX TO ADJOINING 7.5 MAPS

VEGA RESERVOIR, COLORADO
7.5 MINUTE SERIES
SHEET NUMBER 42 OF 46

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

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NORTH

QUADRANGLE LOCATION

SCALE 1:24000

KILOMETERS

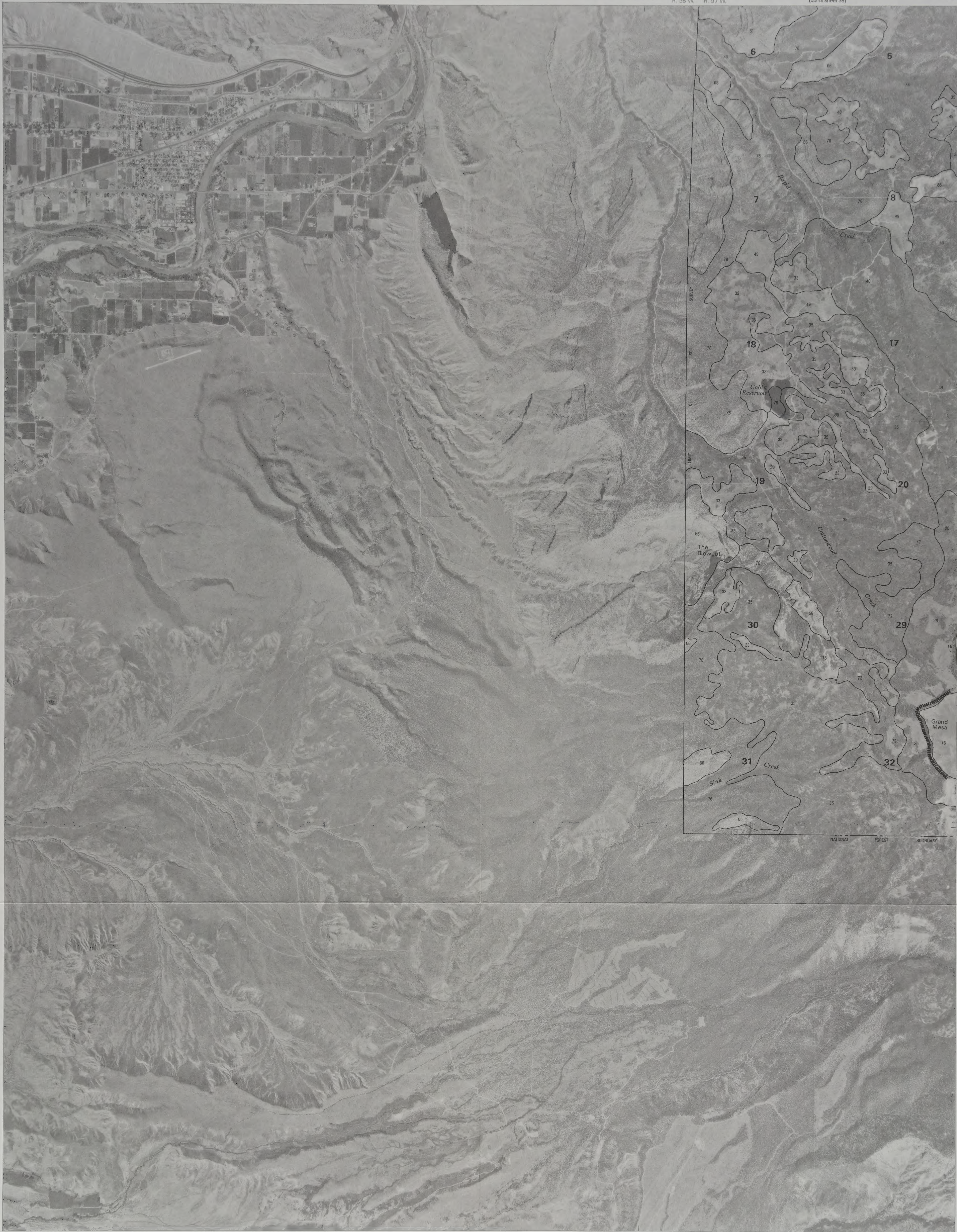
FEET

MILES

INDEX TO ADJOINING 7.5 MAPS
1 SOUTH MAMM PEAK
2 HIGHTOWER MOUNTAIN
3 FLATIRON MOUNTAIN
4 VEGA RESERVOIR
5 SPRUCE MOUNTAIN
6 LEON PEAK
7 CHALK MOUNTAIN
8 ELECTRIC MOUNTAIN

PORTER MOUNTAIN, COLORADO
7.5 MINUTE SERIES
SHEET NUMBER 43 OF 46

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE



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NORTH

QUADRANGLE LOCATION

SCALE 1:24000

KILOMETERS

1000 0 1000 2000 3000 4000 5000 6000 7000

FEET

MILES

1	2	3
4		5
6	7	8

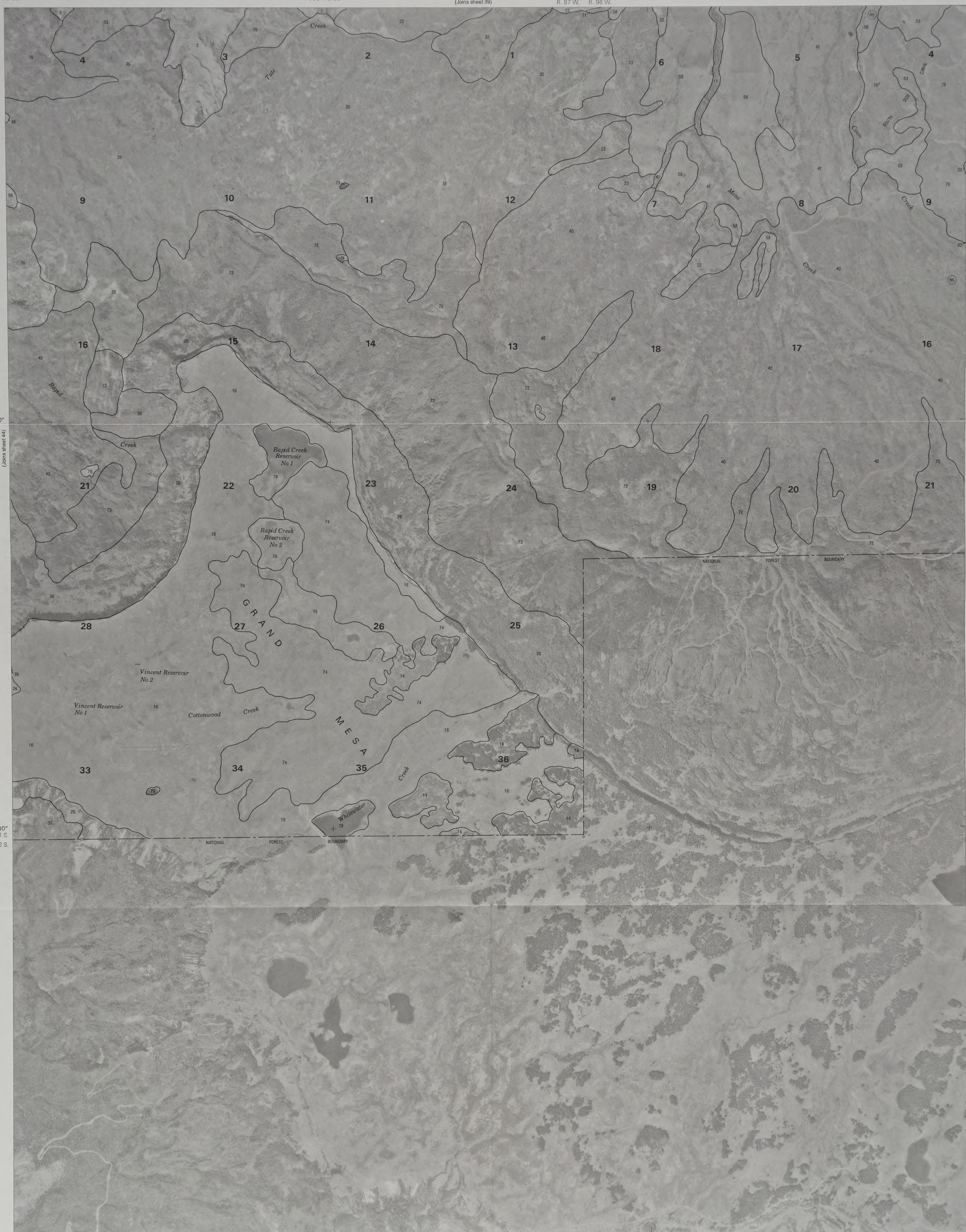
1 ROUND MOUNTAIN
2 CAMEO
3 MESA
4 CLIFTON
5 LANDS END
6 WHITEWATER
7 JUNIATA RESERVOIR
8 INDIAN POINT

INDEX TO ADJOINING 7.5 MAPS

PALISADE, COLORADO
7.5 MINUTE SERIES
SHEET NUMBER 44 OF 46

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

DOUGLAS PLATEAU AREA, PARTS OF GARFIELD AND MESA COUNTIES, COLORADO
LANDS END QUADRANGLE
SHEET NUMBER 45 OF 46



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North American Datum of 1983 (NAD83), GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 12. Coordinate grid ticks and land division data, if shown, are approximately positioned, and in some cases may be projected in areas not surveyed. Digital data are available for this quadrangle.

NORTH

QUADRANGLE LOCATION

SCALE 1:24000

KILOMETERS

FEET

MILES

DOUGLAS PLATEAU AREA, COLORADO NO. 45

1	2	3
4		5
6	7	8

1 CAMEO
2 MESA
3 MOLINA
4 PALISADE
5 MESA LAKES
6 JUNIATA RESERVOIR
7 INDIAN POINT
8 HELLS KITCHEN

INDEX TO ADJOINING 7.5 MAPS

LANDS END, COLORADO
7.5 MINUTE SERIES
SHEET NUMBER 45 OF 46

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

DOUGLAS PLATEAU AREA, PARTS OF GARFIELD
AND MESA COUNTIES, COLORADO
MESA LAKES QUADRANGLE
SHEET NUMBER 46 OF 46

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North American Datum of 1983 (NAD83). GRS-80 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 12. Coordinate grid ticks and land division data, if shown, are approximately positioned, and in some cases may be projected in areas not surveyed. Digital data are available for this quadrangle.

NORTH

QUADRANGLE LOCATION

SCALE 1:24000

KILOMETERS

FEET

MILES

1	2	3
4		5
6	7	8

1 MESA
2 MOLINA
3 COLLBRAN
4 LANDS END
5 GRAND MESA
6 INDIAN POINT
7 HELLS KITCHEN
8 CEDAREDGE

INDEX TO ADJOINING 7.5 MAPS

MESA LAKES, COLORADO
7.5 MINUTE SERIES
SHEET NUMBER 46 OF 46